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Section Two • August 15, 1998
178 Pages In Two Sections

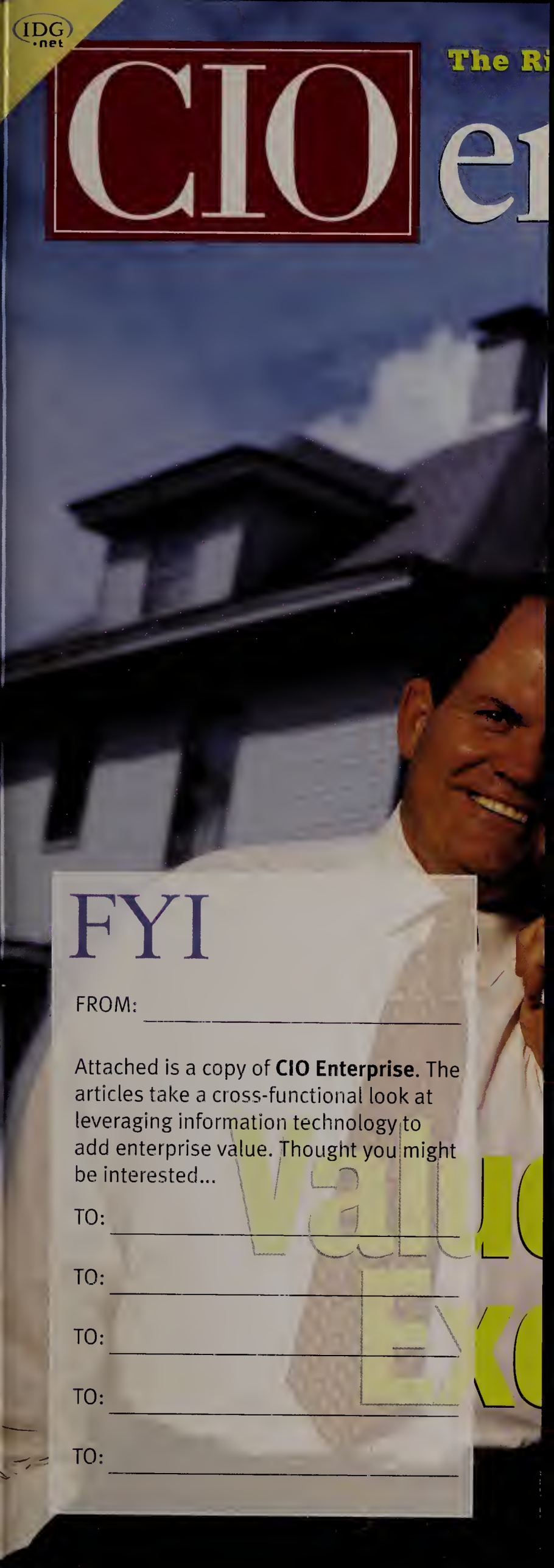
The Risks of Entangling Alliances Page 58

CEO ROUNDTABLE:
How Four Companies Make Their Value Chains Pay Off

The 11th Annual
CIO 100
Value Chain Excellence

Special section coverage begins on page 28

State Farm President and CEO Edward B. Rust Jr.: The quality of interconnectedness is a function of technology.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VOL. 11 • NO. 21 • AUGUST 15, 1998 • 178 PAGES IN 2 SECTIONS
SECTION 2

Special Section

CIO 100 the 1998 VALUE CHAIN EXCELLENCE

28 **Chain Commanders**
COVER STORY: CEOS AND VALUE CHAINS Four CEOs discuss value chains and the role of technology in strengthening their customer and supplier relationships. *By Derek Slater*

38 **The Incredible Journey**
SUPPLY CHAIN ANATOMY Follow a bottle of Listerine on its trip from the eucalyptus fields of Australia to your medicine cabinet for a look at the supply chains of Warner-Lambert and CVS. *By Jennifer Bresnahan*

48 **Cluster Power**
COMPETITIVE STRATEGIES "If you can't beat 'em, join 'em" rings true to proponents of industrial clustering, a new business strategy. *By Gary Abramson*

58 **Beware the Weak Links**
RISK MANAGEMENT Although tightly integrated supply chains yield lower costs and higher profits, tighter links mean greater risks if something snaps. *By Carol Hildebrand*

68 **Improved Circulation**
PROFILE: NONPROFIT Among the leading nonprofit enterprises is the American Red Cross, which collects, processes and distributes thousands of units of human blood every day. *By Anne Stuart*

ON THE COVER: Like a good neighbor, Edward Rust is there to ensure that all of State Farm's customers and agents get the benefits from its value chain.
Cover photo by Greg Gillis

"Our customers were on the Web. Our data was on the mainframe.

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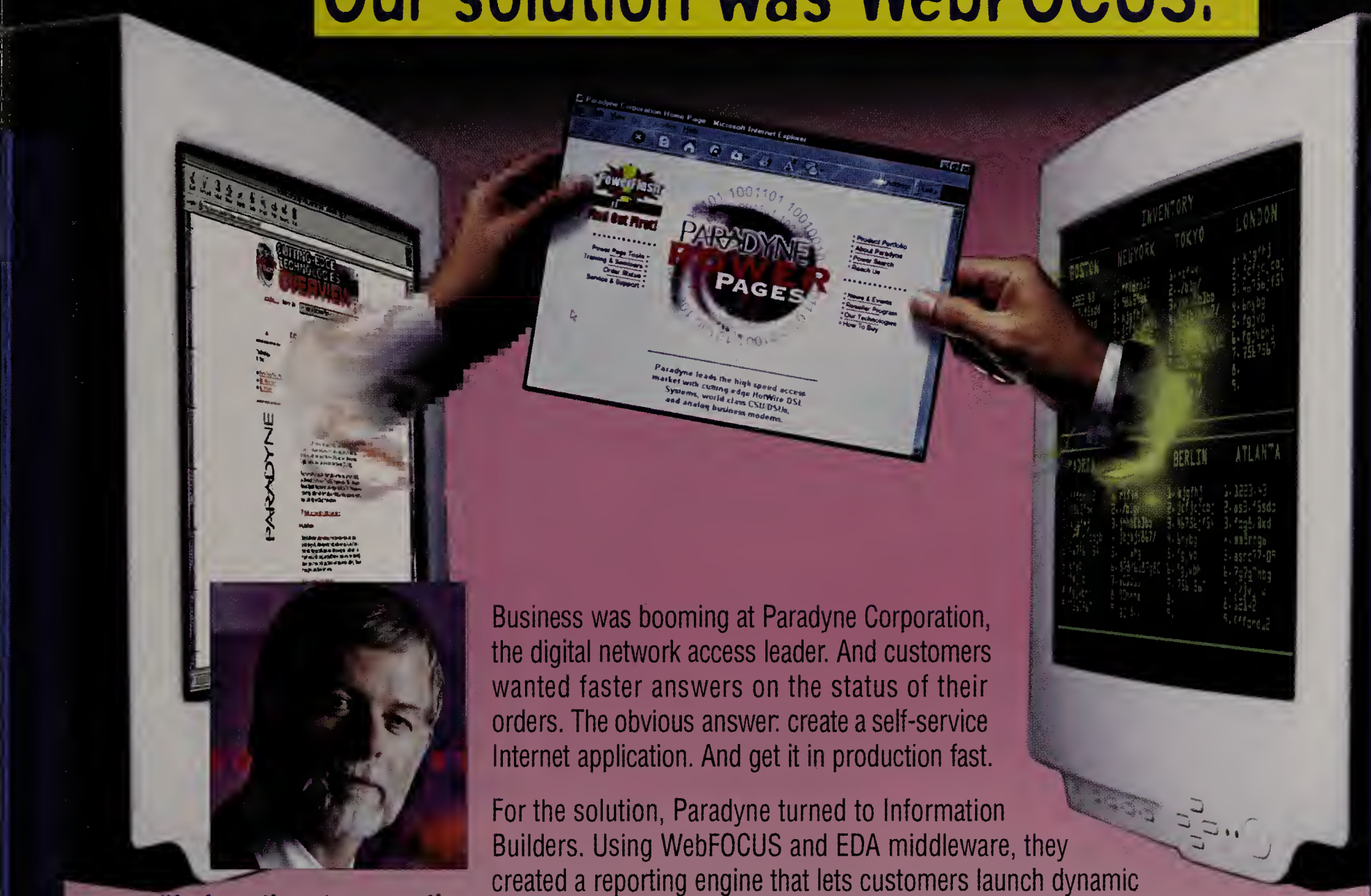

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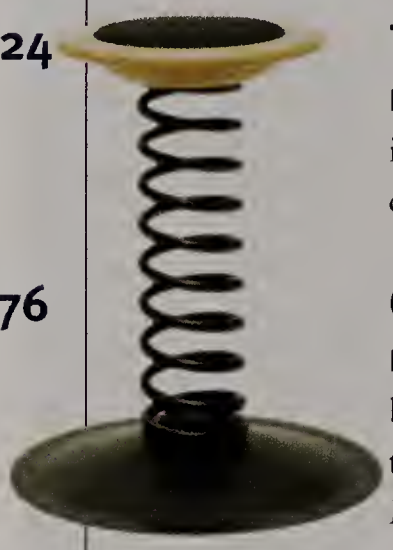
Columns

20 **Too Much Ado About Nothing**
REALITY BYTES A look at history could ease the histrionics in the e-privacy debate. *By Megan Santosus*

24 **The Expert Is Out**
INTELLECTUAL CAPITALISM Bringing in outside experts can jump-start creativity. *By Carol Hildebrand*

76 **On the Money**
HANDSHAKE American Express builds customer loyalty by printing targeted offers on customers' bills. *By Louise Fickel*

84 **Operating Systems at Work**
LEARNING CURVE Get to know one of your closest coworkers. *By Tom Wailgum*



Departments

6 **Contributor's Page**

8 **In My Opinion**
Letter from the publisher • On our Web site

12 **Plugged In**
Eisner! Drop and Give Me 20! • CEO Inc. • Finance, R.I.P. • Give Me a Break • IT and GNP (Wowee!) • Technology Inches Toward the Boardroom • Rah-Rah Boom Times

82 **Index**

12

Inside Section 1

CIO-100 INTRODUCTION Whether your value chain is forged of tempered steel or spreads out in webs of spun silk, its strength is in the connections.

PROFILE: FINANCE State Street and its customers tap into the same network, no matter where they are on the planet.

PROFILE: SERVICE Norfolk Southern approaches problems cautiously, but its results are anything but conservative.

PROFILE: MANUFACTURING Excellent IT infrastructure makes Intel the link that defines the strength of the PC industry's supply chain.

PROFILE: RETAIL Office Depot's new inventory management system keeps stock availability levels up and costs down.

BEHIND THE SCENES Judges for the 1998 CIO-100 include academicians, analysts and consultants with a broad range of expertise.

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Re: From Us to You

A humble bottle of Listerine stands as a testament to the true interconnectedness of human society.

THE VALUE CHAINS OF EVEN the simplest products are amazingly complicated and commingled with technology. A humble bottle of Listerine, for example (see "The Incredible Journey," Page 38), stands as a testament to the true interconnectedness of human society, as well as to the benefits of shrewdly applied IT. Every product or service in existence passes through a series of steps before coming to rest in our homes or offices. That's why we chose value chains as the theme for our annual CIO-100 award issue.

Even our small shop at *CIO* has a complicated value chain hinged on technology. To bring you an issue, writers, editors, copy editors and fact checkers generate and refine ideas and articles using the Internet, our intranet, a document management and workflow system, and Notes databases, not to mention e-mail and Microsoft Word. Designers use Quark and PhotoShop software to visually enhance the work of writers and editors. They hand the layout on a disk to a prepress outfit, which turns the content, plus ads laid out by *CIO*'s production department, into film plates. The plates go to a printer to become the magazine in front of you. Our Web team converts articles into HTML and augments them with audio, video and additional research. All the while, *CIO*'s sales force uses our intranet and sales-force automation tools to procure *CIO*'s lifeblood—advertisements—and communicates via e-mail, telephone and fax with the production department, which uses a software billing system to coordinate advertiser billing.

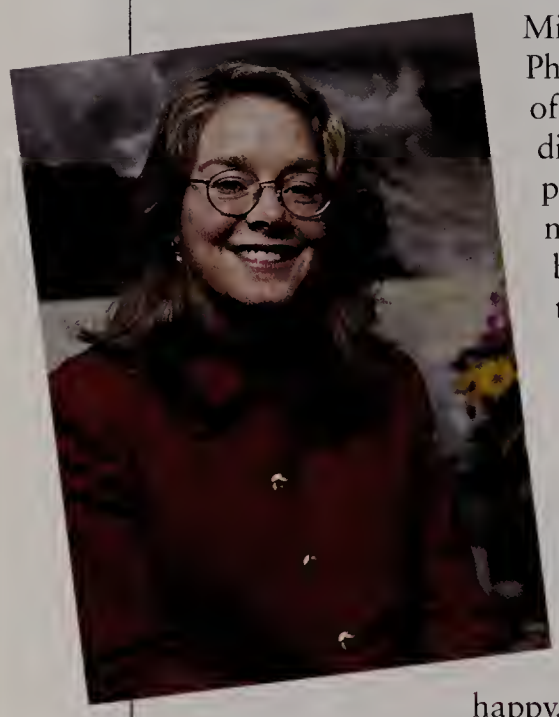

PHOTO BY WEBB CHAPPELL

To keep the product fresh and customers happy, the marketing department tracks the market with information push services; our executive programs department puts on events for our readers; and the circulation department makes sure the right people are getting the magazine, all with the help of huge databases of demographic information. Behind it all are the finance, IS and general administration folks, who rely on our intranet and several financial software packages to do their work.

The value chains of this year's CIO-100 winners are even more complicated. They also happen to be changing the rules for doing business. If the information in this issue impresses you as it did us, you'll never look at the contents of your medicine cabinet the same way again.

Jennifer Bresnahan

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In My Opinion

"Once you start to use technology, you can start to organize your company differently. You can flatten it. You don't have as rigid a hierarchy, which I think is always good."

–William T. Esrey
Chairman and CEO, Sprint Corp.

DID YOU EVER HEAR, "WHEN I WAS A KID..."? I CAN'T tell you how many times my parents made me listen to some tale about how much "different" the world was when they were younger.

It used to be that change came slowly, and the lines between generations were distinct and clear. But today, innovation and technology are continually changing the way we live. What was new last year, or even yesterday, becomes old by tomorrow when compared with the rapidly evolving standards of technology.

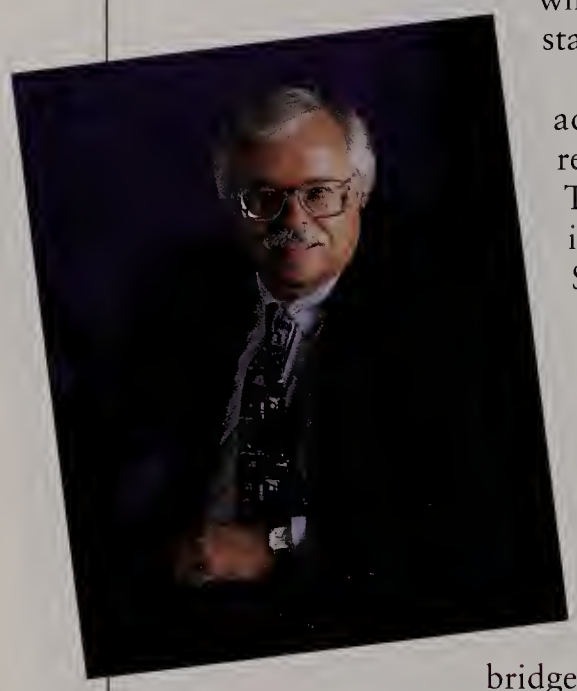
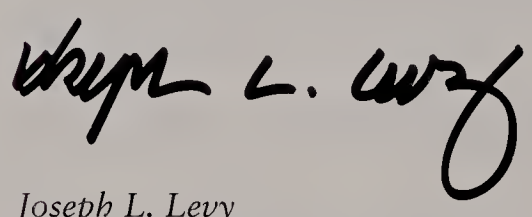


PHOTO BY WEBB CHAPPELL

For a company to be successful, it must adapt quickly and spend less time reminiscing about the way things were. The value chain is an excellent illustration of the power of technology. Separated by distance, by title or by location, businesses are exploiting IT to close the communication gap between all the parties across their value chains.

CIO spoke with the CEOs of four CIO-100 companies to find out what role IT is playing in moving their businesses forward (see "Chain Commanders," Page 28). In each company, technology builds the bridge, strengthening relationships internally and externally with suppliers, partners and customers like never before.

For Sprint Corp., information used to travel slowly up an internal hierarchy. Now, Sprint is not only channeling internal communications at high speeds throughout its organization, but it is sharing information across its value chain, expanding partnerships and exploiting information cooperatively with its partners and competitors as it looks toward the high-speed, online possibilities of the future. The lessons learned from all the CIO-100 companies—forming tight relationships and binding them with IT—is one tale worth passing on.



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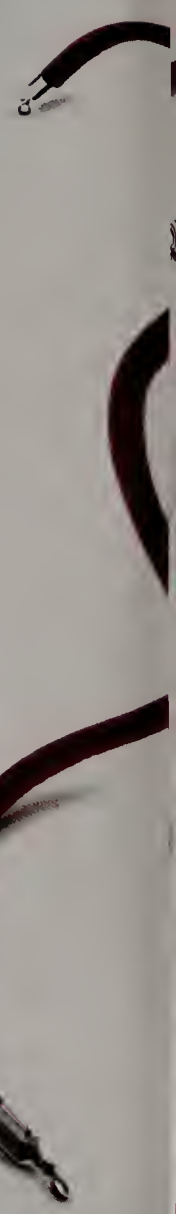

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Plugged in

In Their Own Words 14

Ask the Expert 14

Business Functions 14

Working Conditions 16

Digital Economics 16

IT and Business Alignment 18

Survey Says 18

Coaching Strategies

Eisner! Drop and Give Me 20!

HOW DIFFERENT THE WORLD MIGHT be today had executive coaches been around to smooth the rough edges of medieval leaders: "Now Attila, I know you were listening to Lothar, but did you really hear what he was saying?"

Modern-day corporate Attilas are certainly benefiting from executive coaching—a mix of listening, advice and behavior modification—as companies try to keep their Type A executives from running roughshod over colleagues and subordinates at the office. But experts caution that the coaching trend may be getting out of hand.

Some executive coaches complain that their ranks are being infiltrated by shrinks with little or no business background, who fail to adequately differentiate coaching from traditional psychological therapy. The danger, critics say, is that these coaches may be tempted to try to take on difficult therapeutic challenges in the boardroom. Coaches should be dealing with communication issues not mother issues, says **Steven Berglas**, an executive coach and faculty member of Harvard Medical School. "The problem being coached must be inherent in the person's work domain and not be manifest in every aspect of his or her life," he says. "If someone's just a jerk and they want that coached out of them, you can't do it. That's not a work issue; it's a life issue. You have to refer them to a therapist."

Coaches need to focus on helping clients achieve specific goals, such as better communication with subordinates, and then move on, says Berglas. Traditional therapists may want to stay on to help others in the company—a big no-no, he says. "These people want to become shrink to the firm, and you just can't do that," he says. "You can't be a neutral advocate for someone if you're working with three different departments in the company at one time." *–Christopher Koch*

ILLUSTRATION BY BEN FISHMAN

Name Marketing

CEO Inc.

A ranking of chief executives whose names have become brands as powerful as the companies they lead

1. Bill Gates	Microsoft Corp.
2. Michael Eisner	The Walt Disney Co.
3. Lou Gerstner	IBM Corp.
4. Larry Ellison	Oracle Corp.
5. Jack Welch	General Electric Co.
6. Lew Platt	Hewlett-Packard Co.
7. Michael Dell	Dell Computer Corp.
8. Sandy Weill	Travelers Group
9. Peter Bijur	Texaco Inc.
10. John Chambers	Cisco Systems Inc

SOURCE: CHRISTIAN & TIMBERS. FIVE CATEGORIES WERE USED TO RANK THE CANDIDATES: A CHRISTIAN & TIMBERS ASSESSMENT, NUMBER OF MENTIONS IN THE MEDIA SINCE 1997, PERCENT CHANGE IN COMPANY REVENUES FROM 1995 TO 1997, PERCENT CHANGE IN COMPANY PROFITS FROM 1995 TO 1997 AND TOTAL COMPANY REVENUE IN BILLIONS OF DOLLARS.

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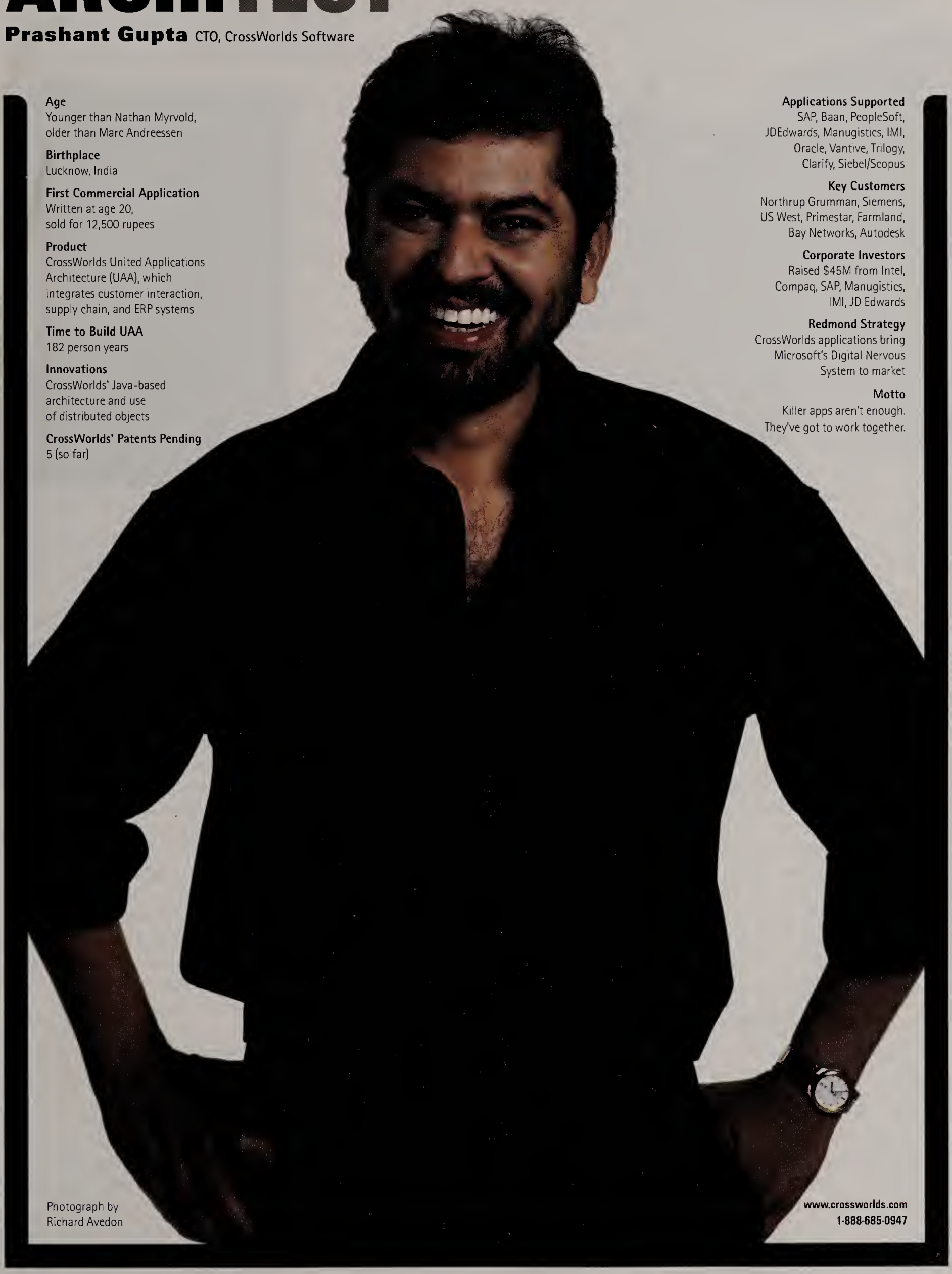
Prashant Gupta CTO, CrossWorlds Software



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In Their Own Words

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–Peter Drucker, speaking at the 1998 International Knowledge Management Symposium, when asked who the greatest manager ever was

Ask the Expert

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Business Functions

Finance, R.I.P.

TALK ABOUT BITING THE HAND THAT FEEDS YOU. A study by The Hackett Group predicts that the finance function will undergo a fate similar to communism in Russia, largely because of the very technology that helped put finance on the map in the first place.

"Finance was really one of the first functions to adopt technology in the '60s, and it will be one of the first functions to get eaten by technology," says **Greg Hackett**, president of The Hackett Group. The Hudson, Ohio, company, which provides benchmarking data for various business functions, released "The Book of Numbers: Finance" in March 1998. The study details a rapid decline in the cost of maintaining finance operations over the last decade due to streamlining processes and leveraging technology. Hackett predicts that the finance function will shrink drastically within the next five years, with 70 percent of finance groups disappearing.

The study contains many other eye-opening findings. Analysts, some of the most highly skilled members of many companies' finance organizations, spend the majority of their time locating data rather than performing analysis or doing strategic planning. And analysts aren't the only group wasting its talents. The study found that finance workers in the average organization spend 65 percent of their time on transaction processing, 12 percent on decision support and only 4 percent on finance management. According to the study, transaction processing represents jobs that technology can—and will—easily replace.

In the past, the finance function acted as a filter between the business and the computer, Hackett explains, stacking up numbers and delivering them to various business units. According to Hackett, the business units just need the data; they are more than happy to do the thinking on their own. Companies are beginning to realize that it makes little sense to pay people to bring information to business units' desktops when technology gives the desktops the legs to march over and get it themselves.

As for the survivors of finance's demise, will they be able to adapt to a function where they are the subjects rather than the rulers of technology? That depends, says Hackett, on "if you can retool those people to think rather than stack."

–Meg Mitchell

ILLUSTRATION BY BEN FISHMAN

YOUR NETWORK SECURITY SYSTEM IS ALL BARK AND NO BITE.

There's something inherently intimidating about a guard dog. Until you realize all it takes is a big juicy steak to stop him in his tracks.

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Working Conditions

Give Me a Break

EVER PAUSE TO THINK HOW LUCKY you are that you can leave your desk when the, um, need arises?

Apparently rest breaks during the workday gnaw at the puritanical souls of many U.S. employers, who, according to the U.S. Bureau of Labor Statistics, denied paid rest breaks—let alone bathroom breaks—to 25 percent of blue collar and service workers in medium and large private companies in 1993. Consider this: At a Nabisco food-processing plant in Oxnard, Calif., female assembly line workers say they were forced to wait hours to go to the bathroom and filed suit against the company in 1995, claiming they were getting bladder and urinary tract infections from the protracted waiting times.

Dickensian scenes like this are not limited to factory assembly lines, however. Teachers, pharmacists and service workers also suffer the sometimes harmful effects of irregular or nonexistent bathroom breaks.

But when the call center is humming or the class is in session, many employers are reluctant to let workers leave their posts. While the U.S. Occupational Safety and Health Administration (OSHA) has long mandated that toilets be available to workers, it has not said much about actually letting people use them, according to **Marc Linder**, a professor at the University of Iowa College of Law in Iowa City, Iowa, and co-author of *Void Where Prohibited* (1998), a book detailing the history of the bathroom break. Last April, OSHA released a vaguely worded memo officially making the connection between workplace toilets and their intended use, but OSHA has to be more specific, Linder says. "OSHA has left itself too much room [for waffling] in its enforcement policy. If a worker has his hand raised for 30 minutes before he is allowed to go to the bathroom, is that reasonable?"

Here's one solution: Lock stingy employers in a conference room for a few hours with a big pot of coffee. We think the sympathy will flow.

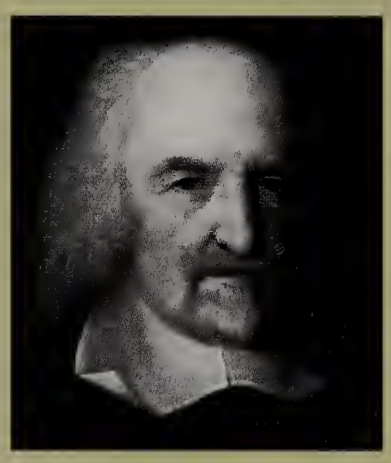
–Christopher Koch

ILLUSTRATION BY BEN FISHMAN; PHOTO BY CORBIS-BETTMANN

Digital Economics

IT and GNP (Wowee!)

WITHOUT GOVERNANCE BY A STRONG CENTRAL POWER, wrote Thomas Hobbes, there'd be no arts, no letters, no society. As if that wasn't bad enough, he went on to say that life would be nasty, brutish and short. Hobbes obviously wasn't aware of the Internet. The decentralized Internet now offers arts, letters, even society, as well as boatloads of information and endless commercial opportunities.



Hobbes: anti-Net?

According to "The Emerging Digital Economy," a report released in April by the U.S. Department of Commerce, Internet traffic has been doubling every 100 days. The report calls the Internet the fastest-growing technology ever, topping radio and television, presumably even the wheel and flint. And the Internet is just the tip of the information technology iceberg. The report credits the growing field of IT with holding down inflation, creating jobs and constituting 8.2 percent of the nation's GDP. The report looks extensively at the Internet and urges a distinctly non-Hobbesian approach to its governance: External control should remain minimal. The report offers much historic background, industry case studies and company examples to support its conclusions. You can read the report online at *www.ecommerce.gov/emerging.htm*. ■

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IT and Business Alignment

Technology Inches Toward the Boardroom

WHAT PROPORTION OF YOUR STRATEGIC options are currently influenced by IT? This and other questions were posed to CEOs and IT directors at 505 leading companies in North America, the United Kingdom, Germany and Scandinavia. The executives were polled at random by the Guildford, England-based international consultancy Compass Inc. for its 1998-2000 "World IT Strategy Census."

The London School of Economics conducted the survey, which asked CEOs and IT directors questions on four aspects of IT's role in their organizations: its influence on corporate strategy, its purpose, the influence of suppliers on IT investments and the measurability of IT's effect on the bottom line.

Respondents said that 42 percent of their strategic options in 1998 are influenced by IT. They went on to predict that IT would influence more than half of their key decisions by 2000. IT's strategic influence is reportedly greatest in the field of finance and least in manufacturing. Regionally, North American executives have the highest expectations of IT—they predict it will affect about 60 percent of their strategic options in the year 2000. Scandinavians are most reserved in reckoning IT's future influence (about 49 percent).

On the whole, this report shows a greater confluence of opinion among CEOs and IT directors than in past years' censuses. Of course this isn't true everywhere. One respondent commented, "When it comes to board-level attention, IT is more or less in the same category as office furniture." But the real stumbling block for CEOs embracing IT may be in measuring its value. CEOs reported that about 33 percent of IT expenditures result in a measurable contribution to the bottom line, but IT directors put the number at 46 percent.

There's a paradox in that CEOs increasingly understand IT's importance yet the majority of them still feel they cannot measure it satisfactorily, says **Alan Gonchar**, president of Compass America Inc. The tension of that paradox will force CEOs to look at IT differently. The key trend the census points to, Gonchar says, "is that the world of the CIO is going to change dramatically in the next few years because the CEO is going to have more interest than ever in IT."

–Sandy Kendall

Survey Says

Rah-Rah Boom Times

The 10 hottest fields for 1998 college grads

JOB CATEGORY	PERCENT CHANGE IN NUMBER OF AVAILABLE JOBS FROM 1997 TO 1998	STARTING SALARY
Sales and Marketing	+15.1	$34,601
Computers and Information Science	-10.0	$41,480
Business and Management	+27.0	$36,059
Accounting and Finance	+26.1	$36,205
Engineering	-5.0	$58,513
Clerical and Secretarial	+27.7	$29,992
Education	+147.2	$33,038
Public Affairs and Social Services	+74.7	$26,133
Communications/Media	+26.6	$27,498
Customer Service	+29.6	$26,788

SOURCE: MAY 1998 JOBTRAK INDEX. DATA EXTRACTED FROM A GROUP OF REPRESENTATIVE COLLEGES FROM ACROSS THE UNITED STATES.

ILLUSTRATION BY BEN FISHMAN

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Too Much Ado About Nothing

A look at history could ease the histrionics in the e-privacy debate

BY MEGAN SANTOSUS

WITH THE EUROPEAN UNION'S DIRECtive on Privacy Protection in the pipeline and 1,000 privacy-related bills in Congress, you just can't ignore the noise coming from the electronic privacy debate.

And it will only get louder. Come October, when the directive takes effect, personal data originating in the EU—defined as "any information relating to an identified or identifiable natural person"—will be subject to so-called adequate standards of privacy protection. Americans can't be smug about it, either, since the directive prohibits the transfer of such data to countries whose data-handling practices are deemed inadequate—places like Botswana and Uzbekistan. And the United States, Japan and Australia. (For more on the Directive, see "The Great Wall of Europe," *CIO* Section 2, Feb. 15, 1998.)

To mollify Europe and beat Congress to the legislative punch, Christine Varney, former Federal Trade commissioner and now a partner in the Washington, D.C., firm Hogan & Hartson LLP, suggests that U.S. companies adopt "fair information practices" and post them on their Web sites. They need to tell consumers what information is collected and why, and offer options for its use. Web sites must also maintain reliable security and allow consumers to update, delete or correct information about themselves.

Sounds reasonable enough. Yet the impetus for such change rankles. Since the days of King George III, Americans haven't much liked Europe sticking a finger in our pie. U.S. free traders are crying foul about the directive. For one thing, the term *adequate* is open to legal interpretation. More problematic than that, Internet pundits claim, the directive will create a bottleneck in Europe not seen since the Berlin Wall. Centralizing the administration of privacy standards, they warn, will stop Internet-based commerce in its nascent tracks. Such people hold that any policing and regulation of the Internet should be done by the business community itself and not government.

The Clinton administration agrees. Many administration spokespeople have gone on record stating that business needs to take the lead in setting privacy standards and that government should avoid undue restrictions on electronic commerce.

Naturally, taxes are seen as an undue restriction of the highest order. But should individual privacy protection be lumped in that category? Many Internet supporters think it should, believing that governments have no business restricting the flow of information. But here government action is likely to help e-commerce rather than hinder it.

The idea of giving people a choice about whether their information can be collected and sold makes marketers nervous. But consumers claim they'd do more business online if they knew their privacy rights were protected. They'd have more confidence in the Internet and less fear that Big Brother was out there collecting every tidbit of personal data. And many consumers *would* offer up their data if there was something in it for them, such as coupons or rebates in exchange. Marketers make money off personal data. It seems only fair that data subjects be able to do the same.

Whether privacy becomes a commodity remains to be seen, but much of the panic over regulation is unfounded. The government already restricts the flow of information. Just ask anyone busted by the SEC for insider trading. And government has been regulating business affairs for centuries. In spite of fears and complaints, commerce has survived and thrived even with child labor laws, the minimum wage and antitrust legislation. It's just not credible that government—by requiring consumers to have a say in what information about them is used and how—will crush the prospects of e-commerce. CIO

Features Editor Megan Santosus can be reached at santosus@cio.com. *Send responses to this column or suggestions for future topics to* reality@cio.com.

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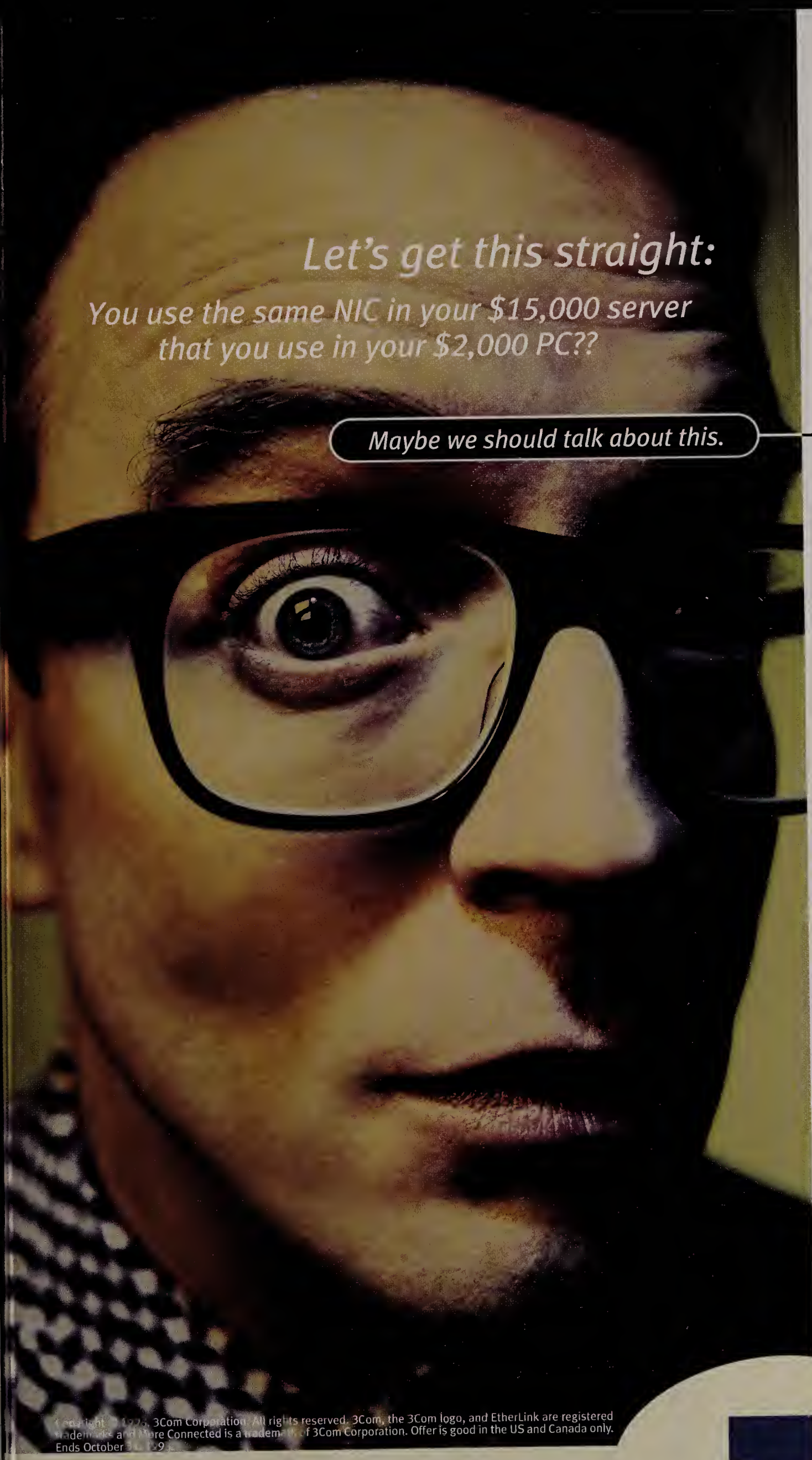
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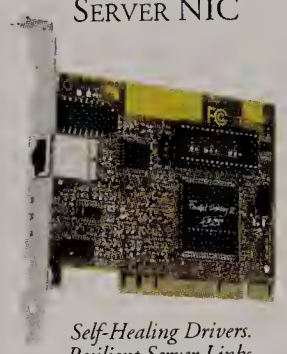

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The Expert Is Out

Bringing in outside experts can jump-start creativity

BY CAROL HILDEBRAND

TO MY MIND, KNOWLEDGE MANAGEMENT projects often have a slight whiff of narcissism about them. Think about it: all that analysis and examination focused intently on the Corporate Id, asking, "What do we know? Who knows it? How much do we know?" If companies had belly buttons, knowledge managers would have a near monopoly on gazing at them. While internal knowledge management efforts can and often do yield good results, smart companies should also remember to keep an eye peeled outside the office. After all, there are a lot more people who work outside a company than inside, and quite a few of them are smart.

The trouble is, if it's hard to find out what you need to know inside the company, think how much more trying it is to discover vital information out in the big world. The sheer immensity of the task tends to induce torpor. Yet despite the difficulty of finding outside experts who can help, there are still good reasons to plunge into extra-company knowledge research. The opinions of outside experts, for instance, carry authority. (Consultants wield the same omniscience. Many CIOs know that the executive board attaches more weight to a consultant's recommendations than to the CIO's, even if both offer the same advice.) And an outsider's view can spark them to throw off preconceived notions and brainstorm more creatively.

But how does a company find the pertinent stuff that will help most in a world bursting with too much information? For furniture maker Haworth Inc., the process was a blend of kismet and the canniness to recognize a good thing when it happens. Holland, Mich.-based Haworth, the world's second-largest office furniture maker, developed what it calls a "Scientific Minds" program to help design a next-generation line of office chairs. The program started almost by accident about two years ago, when the internal ergonomist on Haworth's seating design team invited a colleague to talk about, not surprisingly, ergonomics. That went so well that the group followed up with more speakers. "There's a huge difference between reading somebody's data and having them proclaim their philosophy in person," says Thomas Perrin, an industrial designer on the seating team. "The speakers were inspiring and impassioned, and we said, 'We have to have more.' As we realized these people were out there, we branched out" into newer areas, such as gerontology and behavioral psychology, which Perrin says are easy to relate to chair design. "Now if somebody comes across someone interesting, we sit down and talk to them," says Perrin.

His group has had between 15 and 20 speakers onsite to talk about their areas of expertise. (See "Scientific Minds," Page 26.) "It helped us get in touch with markets and trends, and helped us look for inspiration both in design and how people think," he says.

Perrin's team originally set up Scientific Minds as a brainstorming catalyst just for the seating group. "We'd bring someone in once a month to speak for two days to the seating team," he says. "We'd have a presentation one day, and the second day we'd discuss the talk. We'd just try to bounce a lot of ideas off each other about how the talk and seating might tie together."

As the team grew excited about the nuggets of insight they were pulling from each presentation, Haworth decided to expand the project. "We started opening up the first day to larger groups, like the entire design group, marketing and product development," so that more minds could get inspired, says Perrin.

In fact, he says that a recent presentation featured an archi-

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tect playing an architectural board game with company bigwigs. The executives built structures according to various adjectives and structure types that they were given; for example, a "timeless modern house," or a "friendly traditional hospital," says Perrin. Then people guessed what words each structure represented. "It showed us that our perceptions of other people's intentions can be dramatically different," says Perrin.

Perrin credits Scientific Minds with stimulating creativity within the design team. "It was extremely beneficial," he says. "We weren't looking for quantitative information, we were looking for inspiration."

The seating group found that inspiration in some unlikely places. For example, Dr. Joe McGrath from the University of Illinois talked about how groups collaborate and interact. And Dr. Jim Fozard, the director of the National Institute of Aging in Washington, D.C., talked about the aging workforce and its implications for the workplace. Perrin says that the outside perspectives helped his team get past some long-standing assumptions about seating. "[Scientific Minds] helped us stop identifying chairs by traditional names, like task chair, conference chair and side chair," he says. Instead, the group realized that different jobs could require different chairs. "A sales guy might need a chair to rest in quickly between calls, while a person who does a lot of computer work would need a chair designed for that," says Perrin. "It's a little like different types of athletic shoes."

But the group's biggest breakthrough came when it realized that chairs are not just for sitting these days. "We got into ideas about comfort versus discomfort," says Perrin. "Maybe chairs shouldn't make people so comfortable that they [make people] fall asleep." Instead, chairs should promote frequent postural movements, which can help workers stay more alert and productive throughout the day. Sitting, as it turns out, is hard on the brain. Perrin emphasizes that Haworth is not designing uncomfortable chairs, "but there are different ways that a chair can enhance movement."

Haworth came up with several prototypes—inspired by playground toys—that represent different kinds of movement:

- The Pony, which uses a linear, rhythmic motion
- The Pogo, which promotes multidirectional motion
- The Palette, which links the seat to the work surface and encourages a linear, stretching motion

Now this doesn't mean that Haworth plans to put a rocking horse in every office; the prototypes themselves won't make it to the market. But their functions and ideas will. Perrin and his team have used the insights they've picked up from their learning sessions to produce Haworth's newest office chair, which features torsional action seating, or TAS.

"It incorporates the idea of motion in an office," says Perrin. "The TAS chair has unique control mechanisms that let it recline and also move [from] side to side. You now use the muscles in your sides. In the end, it's much healthier to move the discs in your spine than it is to pad them." The TAS also has less padding but more ergonomic support, he says. "It's molded plastic that flexes," he says. "The combination of molded plastic suspension deals with distribution of a person's entire weight much better. You don't feel like you're sitting in a bucket, and there are no pressure points under your knees."

Haworth is so enthusiastic about the success of Scientific Minds that it has expanded the program companywide. "We're so confident in the benefits of the process that it's ongoing now," says Perrin. "Scientific Minds is now part of every group here." CIO

Senior Editor Carol Hildebrand can be reached at cjh@cio.com.

Scientific Minds

A sampling of Haworth's outside experts

HAWORTH INC.'S seating design group found that breakthrough ideas come from a variety of sources. The company's Scientific Minds program drew from a diverse array of experts, including:

Dr. Joe McGrath
Behavioral Psychologist
University of Illinois
Champaign-Urbana, Ill.
Topic: Groups and collaboration

Dr. Hal Hendrick
Macroergonomist
University of Southern California, Los Angeles
Topic: Macroergonomics in workplace design

Dr. Peter Hancock
Director of Human Factors Laboratory
University of Minnesota
Minneapolis
Topic: Nature of technology evolution

Dr. Steve Barley
Professor
Stanford University
Stanford, Calif.
Topic: Effect of technology on work and work settings

Dr. Jim Fozard
Director
National Institute of Aging
Washington, D.C.
Topic: Aging society's impact on workplace design

Dr. Martin Helander
Ergonomic Scientist
Chairman, Linköping Institute of Technology
Linköping, Sweden
Topic: Workplace comfort and discomfort

Dr. Mary Zalesney
Organizational Psychologist
Battelle Seattle Research Center
Seattle
Topic: 21st century workplace

Dr. Roger Lemmen
Neurologist
Holland, Mich.
Topic: Evaluation of concepts and prototypes

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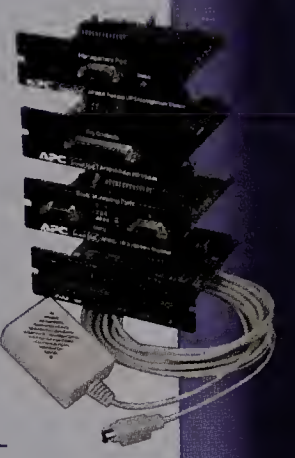

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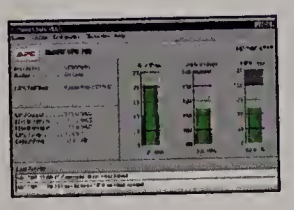

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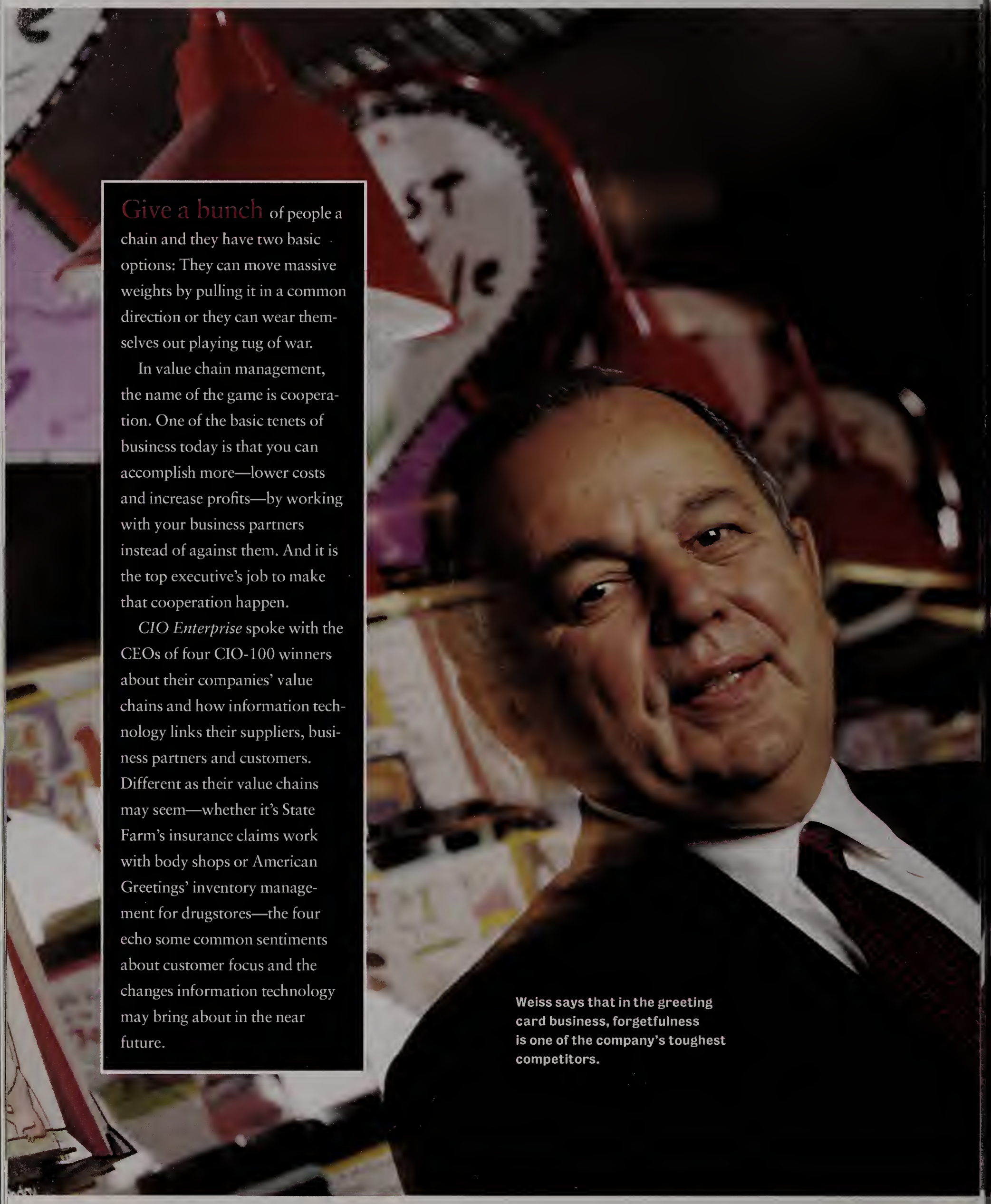

Weiss says that in the greeting card business, forgetfulness is one of the company's toughest competitors.

Give a bunch of people a chain and they have two basic options: They can move massive weights by pulling it in a common direction or they can wear themselves out playing tug of war.

In value chain management, the name of the game is cooperation. One of the basic tenets of business today is that you can accomplish more—lower costs and increase profits—by working with your business partners instead of against them. And it is the top executive's job to make that cooperation happen.

CIO Enterprise spoke with the CEOs of four CIO-100 winners about their companies' value chains and how information technology links their suppliers, business partners and customers. Different as their value chains may seem—whether it's State Farm's insurance claims work with body shops or American Greetings' inventory management for drugstores—the four echo some common sentiments about customer focus and the changes information technology may bring about in the near future.

CEOS AND VALUE CHAINS

CHAIN Commanders

Not all CEOs think of technology as the exasperating in-law from upstate. Four CEOs discuss the critical role IT plays in their value chains. **BY DEREK SLATER**

Morry Weiss, Chairman and CEO American Greetings Corp.

...on American Greetings' value chain

Retailers don't select which American Greetings cards or designs they will sell. Instead, they generally allocate shelf space to us; they say here is 140 linear feet of space, and we decide how much of that space to allocate for seasonal cards or everyday cards, how much is birthday, get well, sympathy or anniversary. Furthermore, we decide what price points to put in. This is an enormous advantage, but on the other hand, we have assumed total responsibility for productivity of that space.

We service about 35,000 retail outlets in the United States. The demographics of a store are of primary concern to us. Stores in Florida need to have an enormous assortment of grandson and granddaughter, niece and nephew products. Stores in younger areas need to have an awful lot of juvenile birthday cards. We do an exact analysis in every store to determine what we are going to put into those 140 feet. All of that starts with the enormous commitment that we have to product development. Every card produced at American Greetings is pre-

PHOTO BY ROGER MASTRIOANNI

tested. We produce it in quantities of 1,000 and measure its performance in test markets, scrap probably the lowest-performing 30 percent and then produce the other 70 percent in ratios relative to their consumer acceptance. We have consumer panels as well. For example, we have a panel composed of 1,000 families that each month send us all the cards they purchased in that month. Another panel of 1,000 send us all the cards they receive each month. All of that testing is an effort to come to grips with what is selling at the retail level and what future products should be like.

Sometimes I'm not sure whether we are part of a very complex industry, and we may well be, or that we have taken a fairly simple business of creating and complicated the hell out of it.

...on the role of technology

From a product development standpoint, technology has been most helpful for things like retrieval of verse, and art and design. Also, three months ago we had hundreds of workers filling orders by hand. Today we have reengineered the whole distribution center and virtually automated the whole order-filling process. We have 13,000 part-time merchandisers—men and women who work for us on a part-time basis who each maintain a store and its inventory and reorder as needed. We take an order and ship it to a store, we pick it up ourselves, we put it out, we take back seasonal returns. The retailers trust our reports because they have examined the information systems that we use and they continue to audit those systems for accuracy. All of our efforts have helped to make the greeting card category a very profitable category for retailers and for American Greetings.

...on the next five years

People want to buy greeting cards; they like greeting cards. It's a business that sort of builds on itself. Forgetfulness is our real competitor. If we can overcome the issue of forgetfulness, we will have grown our business a whole lot. We've introduced technology—Internet technology and CD-ROMs—that we hope will replace forgetfulness with convenience in many cases. In essence, CD-ROM users have access to our library of 1,500 designs for both everyday and seasonal cards.

It's also interesting that we never had young people buying in any large numbers, but with the Create-a-Card Plus, which is the name of our software program, we are seeing young people buying the software to make their own cards. Secondly, men, who are not great buyers other than at Valentine's Day and Mother's Day, are giving more cards now that they can do it in more ways, such as through e-mail and by creating their own. So over the next five years technology will continue to enhance the whole industry by expanding our customer base. ■

Frank Wobst, Chairman and CEO Huntington Bancshares Inc.

...on Huntington's value chain

We can use the ATM networks as an example of the interdependency among suppliers, customers and us. We have the customer list, but we are completely relying on vendors for the equipment and on the telephone companies for the lines to the locations of ATMs—grocery stores, for example. If our ATMs break down, our customers get very dissatisfied—not just the customers who are using the ATMs but also the ones who provide us the location.

Since we are a highly regulated industry and will probably be that way for some time, we are somewhat restricted in what we can offer. We are trying to broaden our offerings of financial services to outside markets to the extent that the regulatory authorities allow us. That means we are more engaged in insurance sales, security sales and so forth than we have ever been before.

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In insurance, our marketing area needs to determine first what products are particularly desirable for bank customers in a particular category. We use a lot of focus groups and also do statistical analysis to determine those needs. Then we have to go to an insurance company or to several insurance companies and ask them whether they have this kind of product and whether they will develop it for us. We then make it available either directly through our bankers, many of whom are licensed, or through insurance agencies that we've started to buy. It is then sold directly to our customer base.

...on the next five years

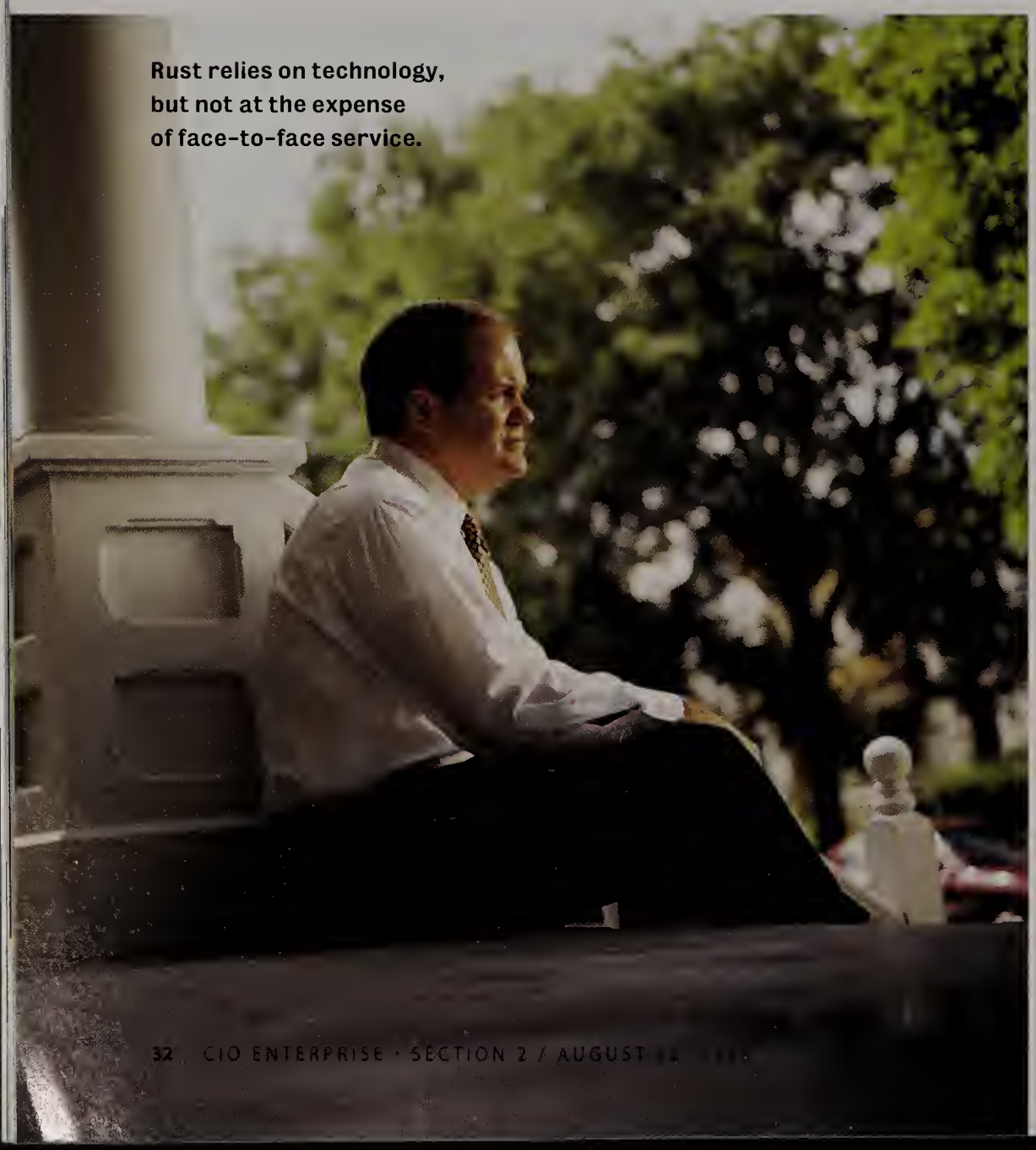
Five years has become such a long time. If you look back and see the changes that have taken place during the last five years, you get an idea of what kinds of changes probably will be coming about in the next five years.

We are in an industry that is changing very fast. We are also in an industry with overcapacity. One thing that will certainly continue, assuming that the economy stays reasonably healthy, is consolidation in the financial industry. We will probably end up with maybe three or four truly national players.

The delivery of banking services is going to change. We will see more and more financial transactions being done electronically. Right now only 20 percent of retail transactions are electronic. That percentage will increase every year. Our institution, for example, has just opened its 100,000th Web site account. Four years ago we had none. The challenge for banks is to balance the two delivery systems. We must combine the old-fashioned one, which we cannot abandon because the majority of our customers want it, with the new and push our customers gently in the direction of electronic banking. It is a huge cost reduction—the cost per transaction goes from dollars to pennies.

There are a number of delivery vehicles other than the Internet that might emerge during the next few years. Interactive TV through cable TV could conceivably be one delivery mechanism. Smart cards will probably play a more important role with the retail consumer. Europeans are much further along in the use of smart cards.

One of the more immediate concerns we have is the year 2000 problem. We started addressing this problem at Huntington several years ago, and while we haven't completely finished our adjustments or the rewriting of our programs, we feel we will not have a problem internally. However, we are now taking surveys and spending an awful lot of time and effort talking with our customers and our suppliers—even more with customers than suppliers—to find out where they stand. The exposure that we have is very hard to gauge. If our customers get in trouble in the year 2000 because their data flow is not adequate, they don't pay the loans back. For banks, this is a major concern. ■



Rust relies on technology, but not at the expense of face-to-face service.

PHOTO BY GREG GILLIS

Edward B. Rust Jr. President and CEO State Farm Insurance Cos.

...on State Farm's value chain

State Farm is the nation's largest home and auto insurer. We insure about 36 million automobiles and about 20 million homes across the United States and parts of Canada. We have close to 73,000 employees, about 17,000 State Farm agents, about 1,000 claims offices scattered around the country, and we deal with around 7 billion complex transactions a year. That gives you some feel for the scalability that we need.

How we are tied together evolves as technology evolves. We are in the process of building what we call our enterprise network, which will tie together all of our claims offices, regional offices and big data centers to make sure that we have the information flows to

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We have been very active in the claims arena in developing relationships with body shops, glass vendors and health-care providers. This effort has reduced the time it takes to process a claim—we've shortened that window between when a claim is reported and when it is settled and paid up. And cost savings in our organization ultimately go to the bottom line, which benefit our customers.

Dealing with a variety of small vendors scattered throughout the country can create some challenges for connectivity. Not all body shops are the same in terms of their electronic capabilities. There are certain basic connectivity requirements body shops need to meet to qualify for our Service First program. Even so, in some of the more remote locations there are communications challenges that you wouldn't necessarily find in more metropolitan areas.

In the car rental area, we are working with about 50 different rental groups across the country. Basically, if you have to put your car in the shop after an accident, we can electronically set up a rental car for you if you need one. This is another example of how we are trying to use information technology to get added value to our customers as soon as possible.

...on keeping track of new possibilities offered by technology

Sometimes we do that better than at other times. The challenge—and I don't think anybody has a good handle on this—is to try to identify what will become the standard that you want to hook your train onto, as opposed to something that is going to hit a dead end in six months. We work closely with the folks at IBM, Hewlett-Packard, Microsoft, Sun—all the major names—to try to keep track of what's going on in this area. Since we're a major user of technology, they also come knocking on our door to make sure we are aware of what is happening. So some good partnering goes on there also.

...on the next five years

We will try to find more people to partner with as we look at where technology is going and how we can provide quality service to our customers. For example, in our fire and casualty business we're working with some contractors in a manner similar to how we work with our Service First auto partners. In our life insurance area, we're looking at ways to reduce the amount of time it takes for a customer to take out a policy loan.

I see technology as a complement to face-to-face service. I don't think technology will ever replace the value of a professional, caring individual being there in your time of need. That is a very critical aspect of our business. Now if you want to look at a number balance or amount due, or you have a question about something in the middle of the night, you can log on to our Web site. The Internet is a convenience tool; however, it will never do away with the hands-on element. ■

William T. Esrey, Chairman and CEO Sprint Corp.

...on Sprint's value chain

The business we are in is meeting the communications needs of our customers, whether they are individuals or large corporations. Today the customer's needs are changing rapidly in terms of reliability, bandwidth and bottom-line price. There is competitiveness in this industry, and it is technology that is allowing us to deliver new services at less cost. We are also working hard to present one Sprint to the customer. We don't want two or three people calling on a customer; we don't want two or three bills sent to a customer.

In an awful lot of industries you will find that companies compete aggressively with one another but then draw forces together with competitors when it is in their interest to do so. That is why we formed alliances in the wireless area and in the international area. It is not typical in our business,

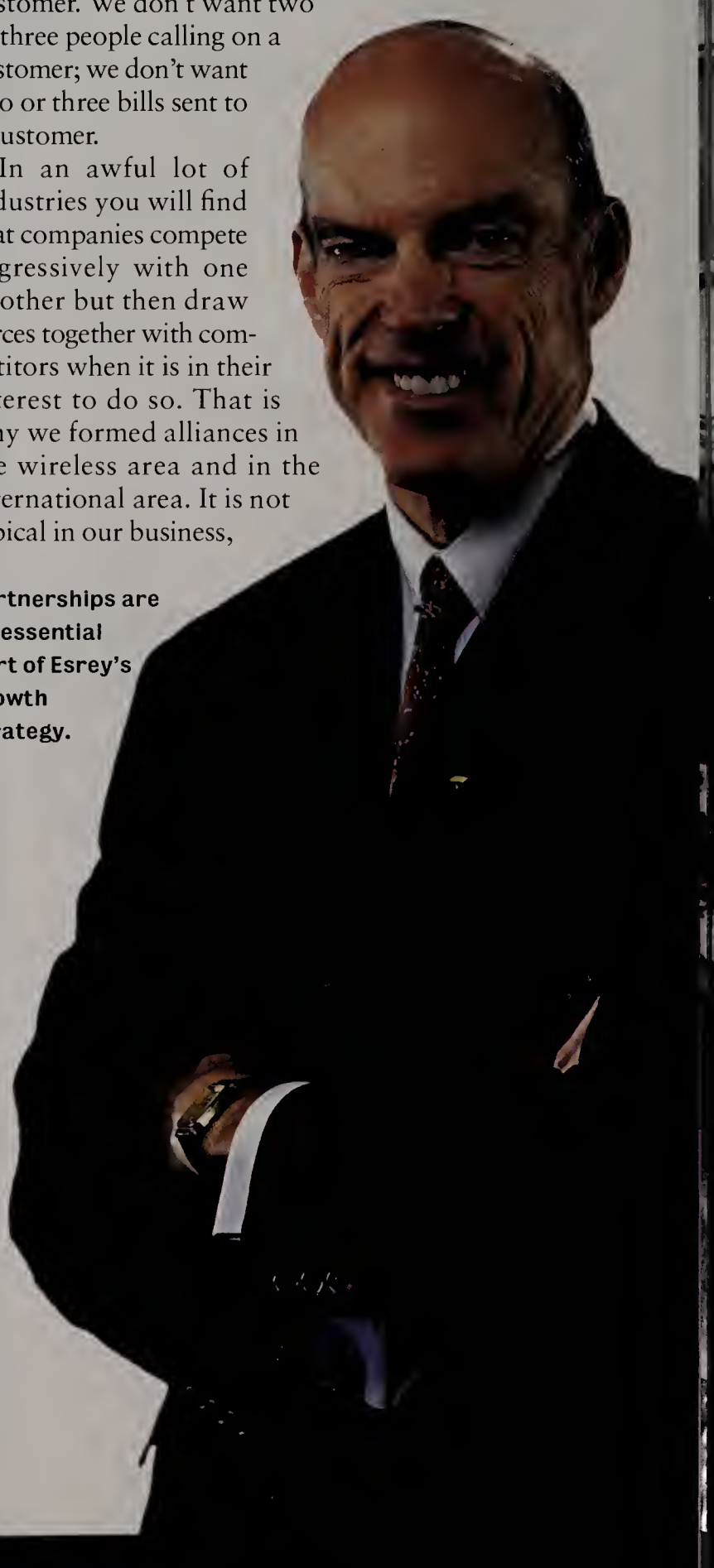

PHOTO BY JOHN LAMBERTON

Partnerships are an essential part of Esrey's growth strategy.

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- organizational strategies
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- creating maintainable, extensive electronic commerce solutions
- electronic commerce strategies
- information discovery
- web to legacy systems
- case studies
- best practices

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and I think the people who see things as "friend or foe" are looking backward and end up ostracizing themselves. We realize we need partners. But partnerships are definitely harder than being able to do it yourself.

...on the role of technology

I talk to many of my peers and they are really behind the curve in using the tools that are available. I don't think you can run a small company, let alone a large company, as effectively if you are not aggressively using the tools that are available.

Think about the way you exchange information. It is not particularly important whether a report is electronic or not. Rather, the issue is who gets it and how you work within your organization. A few years back, if you got a report and wrote a question on it, whom did you send it to? In my case, I might send it to a senior vice president, who would send it to a vice president, who would send it to somebody else, who would send it to the subject matter expert, who would return it back up the chain. A week or 10 days later I got the question answered, but I may have forgotten by that point what the burning issue was. Today our organization has enough confidence that someone in my position can go down three or four levels, ask a question and get the answer. So there is a way you work with people and a confidence in how you use technology. Once you start to use technology, you can start to organize your company differently. You can flatten it. You don't have as rigid a hierarchy, which I think is always good.

...in the next five years

In the next five years things are going to change even faster. I think eventually—perhaps longer than five years—the distinction between long-distance calls and local calls will go away, because the cost of handling those calls will essentially be the same. And I think the concept of being online versus offline will also go away because you will have ports in a home that are automatically online.

Another area of rapid change is bandwidth. [With] high-speed communications, a company doesn't have to have a big call center with a bunch of desks side by side. Instead you can disperse workers right into the home. With remote communications and higher bandwidth, you can think about how to change an organization—the people you hire, where you place them, how much real estate you need, how many offices you need.

So to stay ahead of the curve, companies must understand their customers and bring them the latest technology and communications capabilities. The companies that figure that out—that best meet customers' needs—will be the winners. CIO

Senior Writer Derek Slater can be reached at dslater@cio.com.

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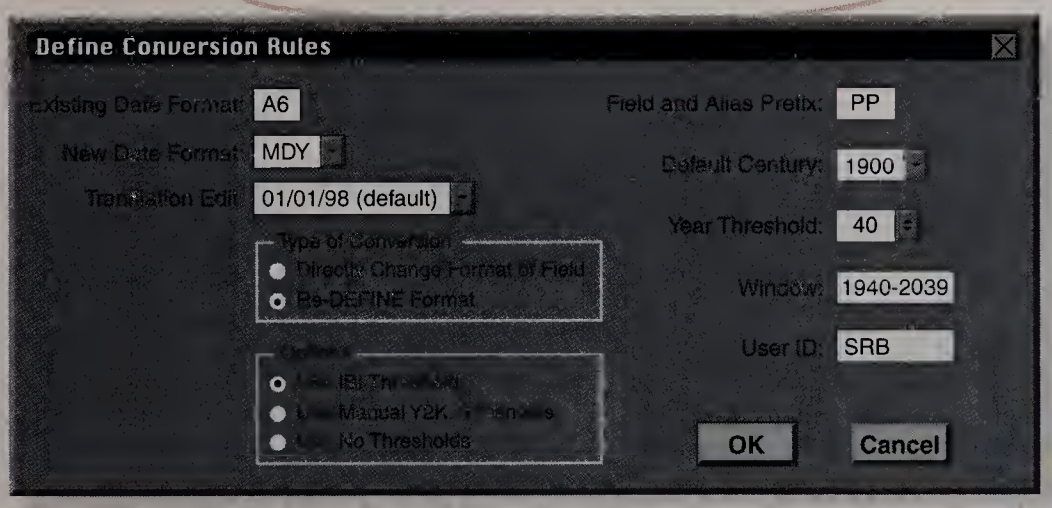

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SUPPLY CHAIN ANATOMY

The INCREDIB Journey

Follow a bottle of Listerine on its trip from the eucalyptus fields of Australia to your medicine cabinet for an inside look at the supply chains of Warner-Lambert and CVS

BY JENNIFER BRESNAHAN

Swish it, spit it, feel the familiar burn. When you swig a mouthful of Listerine antiseptic mouthwash and watch it go down the bathroom drain, you're witnessing something much more significant than the disappearance of the fiery liquid that kills germs that cause bad breath, plaque and gingivitis.

You're seeing the last step in a complex value chain spanning several continents and requiring months of coordination by countless businesses and individuals. The resources involved in getting a single bottle of aqua Cool Mint Listerine into a consumer's medicine cabinet boggle the mind. As it's transformed from raw material to finished product, the product wends its way around the globe and through the value chains and information technology (IT) systems of two CIO-100 winners, the $8.2 billion prescription drug and consumer products manufacturer Warner-Lambert Co. and the $13 billion drugstore chain CVS Corp. Most of the steps involved in manufacturing and distributing Listerine are ongoing, but we've assigned dates to each stage to illustrate the speed of a single bottle's trip through the value chain.

LE

MAY 28

Down Under

Our journey begins in Australia where a farmer is harvesting his spring crop of eucalyptus for eucalyptol, the oil found in its leathery leaves. The farmer sells the crop to an Australian processing company, which spends about four weeks extracting the eucalyptol from the eucalyptus.

Morris Plains, N.J.-based Warner-Lambert (hereafter, WL) partners with a distributor in New Jersey to buy the oil from the Australian company and transport it to WL's Listerine manufacturing and distribution facility in Lititz, Pa. The load will arrive at Lititz about three months after the harvest, says Robert LeRoy, director of material procurement for WL.

The eucalyptus harvest marks the first step in the Listerine supply chain.

JULY 13

Beneath the Sand

Half a world away, a Saudi Arabian government-owned operation is drilling deep under the desert for the natural gas that will yield the synthetic alcohol that gives Listerine its 43-proof punch. Union Carbide Corp. ships the gas via tanker to a refinery in Texas City, Texas, which purifies it and converts it into ethanol. The ethanol is loaded onto another tanker and transported from Texas City through the Gulf of Mexico to New Jersey, where it's transferred to storage tanks and transported via truck or rail to WL's plant. A single shipment of ethanol takes about six to eight weeks to get from Saudi Arabia to Lititz.

AUGUST 25

Sweetening the Deal

SPI Polyols Inc., a manufacturer of ingredients for the confectionery, pharmaceutical and oral-care industries, buys corn syrup from one of several corn-wet millers that purchases corn from farmers in the Midwest. SPI converts the corn syrup into sorbitol solution, which sweetens and adds bulk to the Cool Mint Listerine. The syrup is shipped to SPI's New Castle, Del., facility for processing and then delivered on a tank wagon to Lititz. The whole process, from the time the corn is harvested to when it's converted into sorbitol, takes about a month.

I.T. LINK

How does WL determine the right quantity of raw materials to buy from its suppliers? The sales and marketing group in Morris Plains forecasts demand with the help of Manugistics Inc.'s Demand Planning system. Used with other products in Manugistics' Supply Chain Planning suite, the system analyzes manufacturing, distribution and sales data against expected demand and business climate information to help WL decide how much product to make and distribute and how much of each raw ingredient is needed. For example, it can anticipate the impact of a seasonal promotion or of a production line being down. The sales and marketing group also meets monthly with folks in finance, procurement and operations to project demand over the next several months. The procurement group enters the expected demand for mouthwash into a Marcam Corp. Prism Capacity Planning system, which schedules the production of Listerine in the amounts needed and generates electronic purchase orders for WL's suppliers.

ILLUSTRATIONS BY NICHOLAS VITACCO; PHOTO ABOVE BY DOUG PLUMMER / PHOTONICA; BELOW BY FURNALD / GRAY

PROCESS LINK

What sets Warner-Lambert's supply chain apart? WL's supply chain excellence stems from its innovative Collaborative Planning, Forecasting and Replenishment (CPFR) program, says Hau L. Lee, CIO-100 judge and Stanford University professor. WL launched CPFR a few years ago when it started sharing strategic plans, performance data and market insight with Wal-Mart Stores Inc. over the Internet. The company realized that it could benefit from Wal-Mart's market knowledge, just as Wal-Mart could benefit from its product knowledge. During the CPFR pilot, WL increased its products' shelf-fill rate—the extent to which a store's shelves are fully stocked—from 87 percent to 98 percent, earning the company about $8 million in additional sales, or the equivalent of a new product launch, says Jay Nearnberg, director of global demand management for WL. Every major supply chain vendor now offers CPFR software. Eventually, WL hopes to use the Internet to expand the CPFR program to all its suppliers and retail partners, says Nearnberg.

CVS plans to start sharing strategic plans and data with WL soon, says Nearnberg. The drugstore chain asked WL to delay the partnership until CVS acclimates to its recent flurry of acquisitions.

AUGUST 31

Warner-Lambert Mixes It Up

By now the ethanol, eucalyptol and sorbitol solution have all arrived at WL's plant in Lititz, where employees test them—along with the menthol, citric acid and other ingredients that make up Listerine—for quality assurance before authorizing storage in tanks. To mix the ingredients, flow meters turn on valves at each tank and measure out the right proportion, according to the Cool Mint formula developed by WL R&D in 1990. (The original amber mouthwash was developed in 1879.) This blending process is constant; as ingredients are added to the several-thousand gallon vat, the properly blended liquid is continuously transferred to a separate holding tank. Next the Listerine flows through a pipe to fillers along the packaging line. The fillers dispense the product into bottles delivered continuously from a nearby plastics company for just-in-time manufacturing.

The bottles are capped, labeled and fitted with tamper-resistant safety bands, then placed in corrugated shipping boxes known as shippers that each hold a dozen 500-milliliter bottles. During this process, machines automatically check for skewed labels, missing safety bands and other problems. The entire production cycle, from the delivery via pipe of the Listerine liquid to the point where bottles are boxed and ready to go, takes a matter of minutes. The line can produce about 300 bottles per minute—a far cry from the 80 to 100 bottles that the line produced per minute prior to 1994. In that year, WL switched from glass bottles to sturdy plastic bottles, modernized its production line with high-speed equipment and went from mixing batches of mouthwash one tank at a time to the continuous mixing process.

Each shipper travels on a conveyor belt to the palletizer, which organizes and shrink-wraps shippers into 100-case pallets.

Stickers with identifying bar codes are affixed to the pallets. Drivers forklift the pallets to the distribution center located in the same Lititz facility and store them in a designated spot where they will sit for two to four weeks.

I.T. LINK

How does CVS determine prices? The oral hygiene category manager at CVS headquarters in Woonsocket, R.I., is responsible for deciding what products to stock and how to price them—as well as how to develop promotions with manufacturers to boost sales. To do this, she relies on Category Map, a decision support tool that's connected to the company's massive data warehouse. Category Map draws on data on the past performance of all products as well as market research fed into the system from research firms such as ACNielsen Corp. Using the tool, she can figure out how well Listerine sells compared with other mouthwash

SEPT. 14

Order of the Day

WL receives an EDI order from CVS for 20 pallets of 500-milliliter bottles of Cool Mint Listerine to be delivered by Sept. 16 to CVS's Woonsocket warehouse, which serves all New England CVS stores. The order is automatically screened to make sure the numbers requested are reasonable and the source for the order is legitimate before it is passed on to WL's SAP system, an enterprise resource planning tool from SAP AG. SAP prices the order and determines how much of it is already in stock and how much needs to be manufactured. Generally the order is in stock since the E3 Merchandise Transaction System would've predicted store demand.

That same day, SAP transfers the order to WL's Strategic Transportation Planner made by Manugistics. The Manugistics system determines how best to consolidate order delivery and which shipping companies to use to minimize costs and meet the required delivery time specified by CVS. An action plan specifying those details is drawn up. WL then sends an electronic alert to the chosen shipping companies via EDI.

Meanwhile, the Manugistics action plan is automatically downloaded to SAP, which sends it back to WL's McHugh Software International Inc. warehouse system around 1 a.m. for use by the people on the WL warehouse floor. The McHugh system specifies how the warehouse employees should pick and ship the day's orders.

SEPT. 15

Shipping Out

Because CVS usually orders products in volume, the pick quantities tend to be full pallets, so forklifts are used to transport the order instead of WL's network of automatic conveyor belts used for smaller orders. Every morning WL forklift operators use computers attached to their forklifts as well as handheld scanners with instruction screens linked to the McHugh system to learn what they need to pick up, where it's located and where to transport it. When the lift operators get to the appropriate pallet, they scan the bar code with the handheld device so that the software can confirm it's the correct product. They next bring the pallet to the designated shipping door and use the onboard computer system and handheld to inform the McHugh system that the job is finished. Workers at the shipping door then load waiting trucks with the Listerine, Sudafed, Rolaids, Certs, Lubriderm, Schick razors, Neosporin, Bubblicious and other Warner-Lambert products ordered by CVS, says Mark Kuester, WL's director of logistics and customer support systems.

SEPT. 16

The Handoff to CVS

The load appears at the CVS warehouse in Woonsocket. The trucking company sends WL confirmation of the delivery and who signed for it via EDI.

As soon as the truck is unloaded, the CVS warehouse team generates an electronic receiving notice telling the CVS accounts payable department that it received the goods from WL. The team also downloads the document to the company's data warehouse for future forecasting purposes and to the warehouse management system, which routes the pallets to the appropriate storage site in the warehouse. There they'll sit for as long as three weeks until they are shipped to fill orders placed by CVS stores.

brands and how much money CVS makes on the product, given price and sales rates. Category Map also lets her adjust for special promotions. To set the standard sales price for Listerine, she uses a pricing tool with historical performance data, intelligence gathered on competitors' prices and market data. The tool updates CVS's data warehouse with the official price and also downloads the pricing data to the individual CVS stores where computers print out shelf tags as prices change.

The category manager's recommendations automatically feed into another system, the Merchandise Transaction system made by E3 Corp. The E3 system takes Category Map data and combines it with point of sale (POS) data from the CVS stores as well as inventory information to calculate the exact quantities of Listerine CVS should purchase to meet forecasted store demand. On the same day that E3 figures out how much Listerine to order, it generates a purchase order and sends it via electronic data interchange (EDI) to WL; the information is also sent to CVS's warehouse management system made by EXE Technologies Inc. so that CVS warehouse employees and computer systems know when to expect the order. The E3 system has taken three days out of CVS's order-cycle process, says Leo Hartnett, vice president of efficient consumer response.

ILLUSTRATIONS BY NICHOLAS VITACCO

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PROCESS LINK

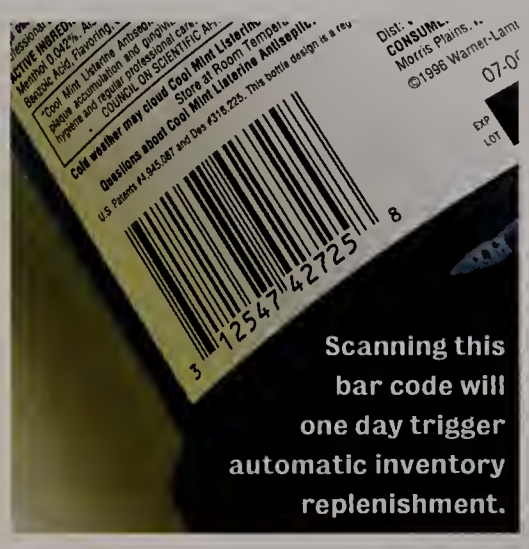
What's noteworthy about CVS's supply chain? CVS has nine main warehouse facilities and 15 satellite facilities. The company's claim to supply chain fame comes from its ability to spread fixed costs across many stores by consolidating orders and coordinating demand and delivery between stores, says Gregory J. Owens, CIO-100 judge and worldwide managing partner for Andersen Consulting's supply chain management practice in Atlanta. If a truck has to deliver to one store, it might as well deliver to three others on the way. This saves money for CVS, which passes on the savings to its customers, says Owens.

SEPT. 29

What's In Store

CVS store managers like Mike McGee, who manages a CVS in Framingham, Mass., represent the next piece of the supply chain. As he does twice a week, McGee walks up and down the aisles of his store with a handheld computer from Telxon Corp. Underneath every product is a bar code label that tells McGee the minimum quantity of the item that should be kept on the shelf. He eyeballs the Cool Mint Listerine shelf and notices that several of the 500-milliliter bottles appear to be missing. Years of experience enable him to estimate that three bottles are gone instead of having to manually count them. He punches an order for three more into his handheld device. At the end of the day, he connects the machine to an IBM Corp. computer and downloads his full order via modem to Woonsocket.

CVS is in the process of installing a wireless network and new handheld computers from Symbol Technologies Inc. to automate ordering, says Hartnett, the efficient consumer response vice president. Store managers will no longer have to manually figure out how much of an item to restock because the handheld will do all the calculations. Managers will scan the shelf label with the handheld, which will send a query for information to CVS's Symbol Spectrum wireless network via the store computer. Within seconds, detailed item information and history as well as the recommended quantity to order will travel back to the store computer and manager's handheld device. Hartnett would not reveal how much time and money the new system will save, but International Data Corp.'s Jill House, associate research analyst for smart handheld devices, says the savings will be significant. "The use of handheld has in past retail pilot trials seen as much as a 10 percent to 15 percent increase in worker productivity and shipping and inventory accuracy nearing 95 percent to 100 percent," she says. "CVS should see comparable returns on its investment."

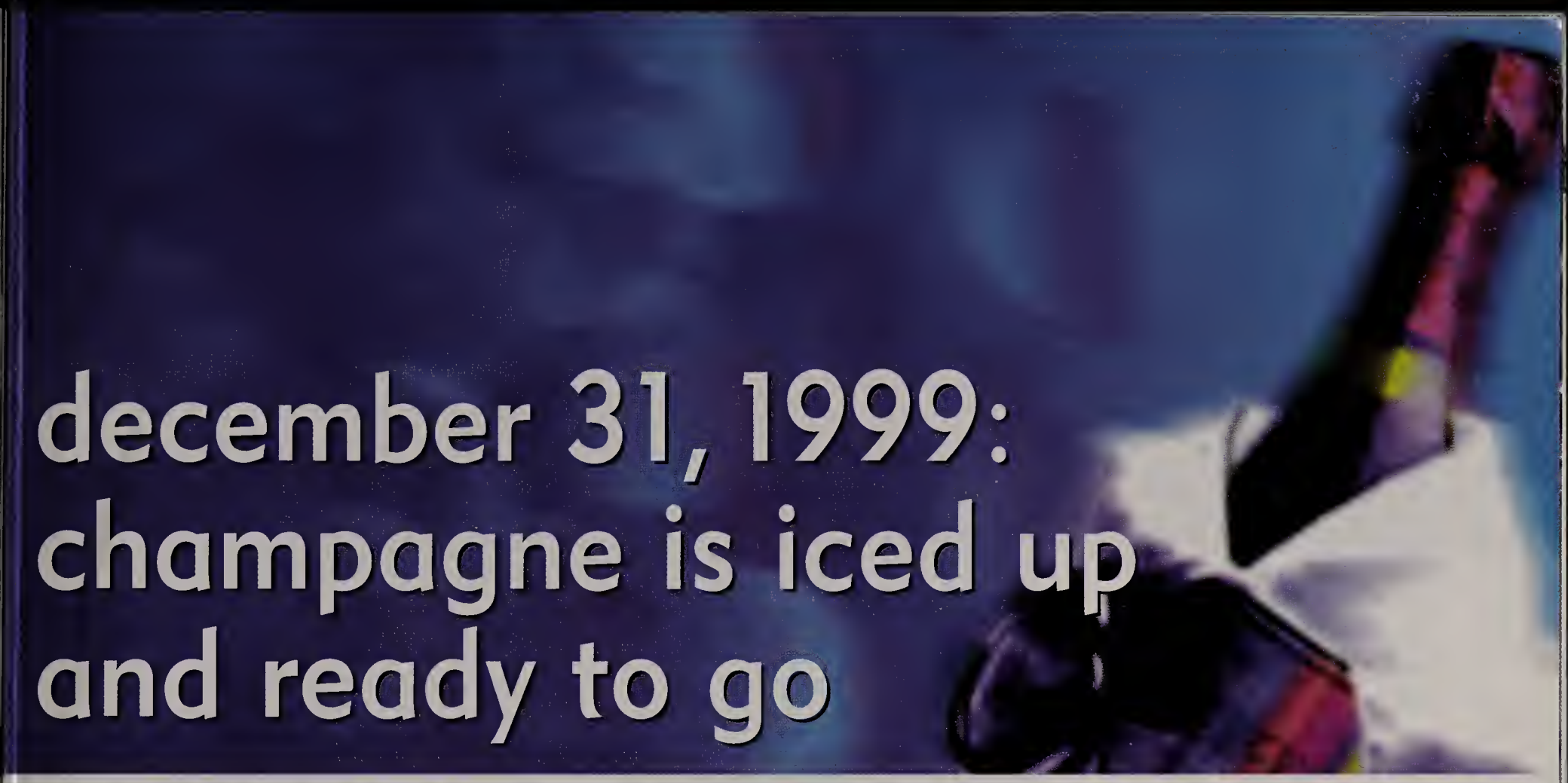


Scanning this bar code will one day trigger automatic inventory replenishment.

I.T. LINK

Why do CVS store managers check inventory levels before ordering when the cash registers collect POS data that could be used for automatic replenishment? The plan is that someday they won't have to. Certainly many other companies already have automatic replenishment systems in place. But CVS is in no hurry to implement a system that could diminish customer service and quality levels without first addressing the political and logistical issues that go along with it, says Senior Vice President for MIS and CIO Howard Edels. "A lot of companies say they have such a system, [including Revco Corp., the pharmacy that CVS recently acquired]," he says. "But when you're talking about something where the computer takes over the responsibility of individuals, you want to make sure everyone buys into that program. CVS is known for its excellent customer service because the store managers are empowered. If they make a mistake [by forgetting to place an order, for example], it's their mistake; they treat you nicely and say, 'I'm sorry, I'll take care of it.' But if they see the computer as having control, the answer becomes, 'I don't know why your order isn't here, the stupid computer didn't bring it.' It changes the whole relationship with customers. So we want to make sure that the store folks really understand that it's helping them. That's why we've been slower than some companies." This careful, conscientious management style is a hallmark of the CIO-100 winners, says Andersen Consulting's Owens.

ILLUSTRATION BY NICHOLAS VITACCO; PHOTO BY FURNALD / GRAY



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PROCESS LINK

How do store managers know how much product to stock? CVS management frowns upon stores keeping extra inventory in the back room because it ties up capital. So instead of having each store manager project demand, once a year category managers at headquarters analyze annual point of sale (POS) data generated in each store and calculate the weekly sales rate for every product by store. Then they multiply that number by four to get the minimum shelf quantity (MSQ). In other words, at any given time, CVS carries four weeks' worth of supplies on the shelves. At Mike McGee's store in Framingham, Mass., the MSQ for the 500-milliliter bottle of the best-selling Listerine flavor, Cool Mint, is 20 because the store sells an average of five bottles per week.

SEPT. 29

Taking Orders

McGee's order and those of the 4,100-plus store managers are transmitted to CVS's E3 system for replenishment and to the warehouse management system for fulfillment. (As mentioned earlier, E3 collects and analyzes data from Category Map, the warehouse management system and from the stores to gain a comprehensive view of what CVS needs to order and when.) The warehouse management system creates an optimized schedule for picking, packing and shipping orders to the individual stores.

SEPT. 30

Pick and Choose

Each morning CVS warehouse employees receive instructions about which pallets to bring to the picking line. Sixty to 70 percent of all CVS inventory goes out to stores in loose pieces—a store manager might order three tubes of Crest, say, and one stick of Sure antiperspirant. This system is labor intensive, but Hartnett says the savings from being able to carry less inventory offsets the extra labor costs. Warehouse employees break apart the pallets, pick individual items and load them into totes destined for specific stores. Amazingly, the error rate for this picking process is less than a tenth of a percent, says Hartnett. He credits good management, on-target technology solutions, employee training and careful planning for the figure. "It is the combination of people, planning, process and systems that allow us to execute our programs efficiently, on time and with minimal error," he says. "If one of these components does not perform to standard, then the entire cycle breaks down." The Woonsocket warehouse delivers to about 80 stores per day; stores receive shipments once or twice a week.

OCT. 1

Product Meets Shelf

In the wee hours of the morning, a CVS truck appears at McGee's store with his order. McGee unloads the tote in the back room and, voilà, there is the bottle of Listerine that originated in the Australian eucalyptus grove back in May. He displays it on the shelf according to the dictates of the store presentation managers at Woonsocket who determine ideal store layouts and product placement.

OCT. 2

The Purchase

Now for the last step of our journey—the customer. A man walks into McGee's store to pick up aftershave and a box of chocolates for the date he's planned for the evening. On impulse, he decides to buy a bottle of Listerine. His purchase is recorded by the cash register and sent to E3 and Category Map that night for future forecasting. In a few days, McGee will place an order for a replacement bottle of Listerine. And so begins the cycle again. CIO

Senior Writer Jennifer Bresnahan can be reached at jbresnahan@cio.com.

ILLUSTRATIONS BY NICHOLAS VITACCO

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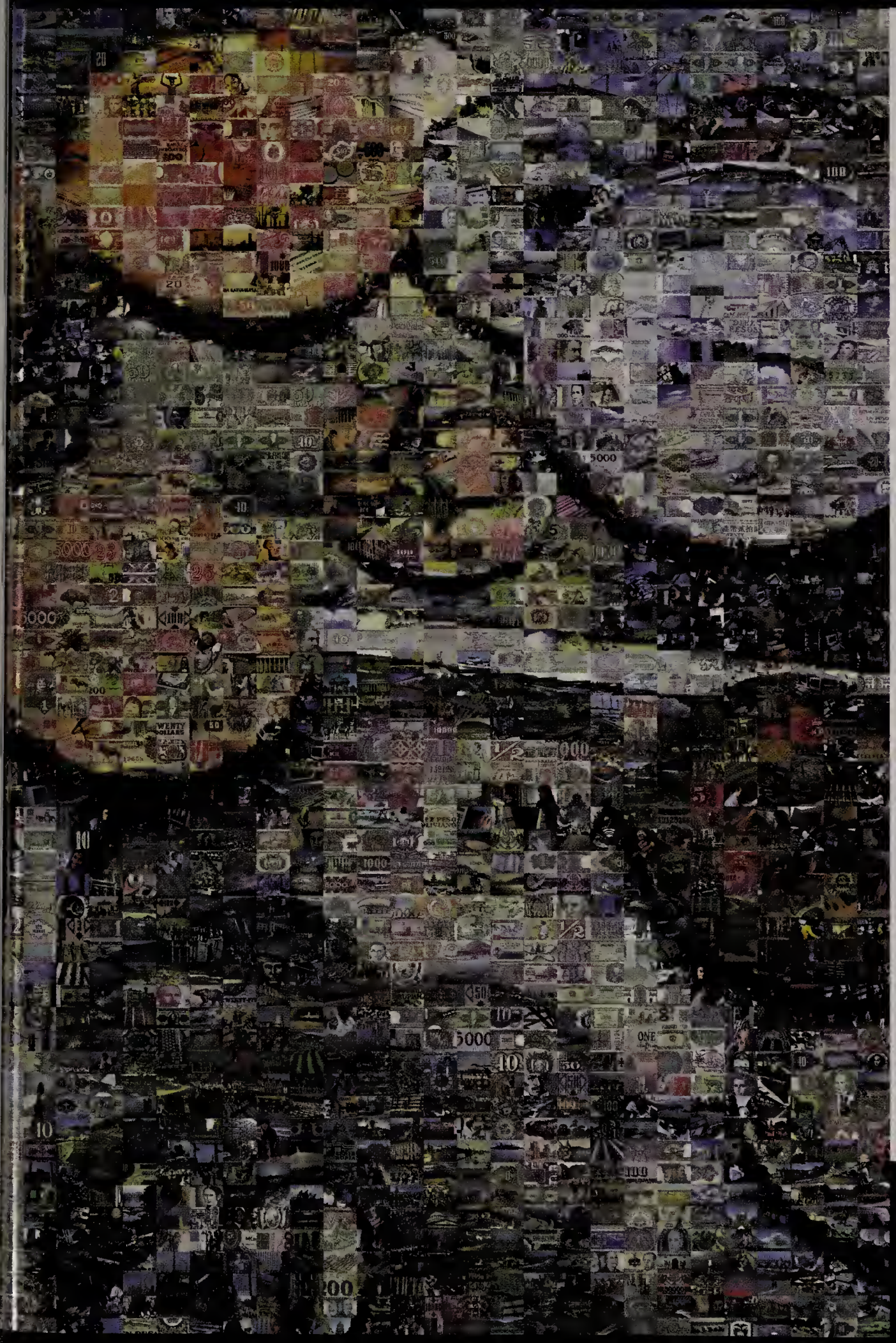

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Donna Campbell, director of Ericsson's CyberLab, wants to tap into the entrepreneurial energy of the small companies in Silicon Alley.

CIO 100 the 1998 VALUE CHAIN EXCELLENCE

COMPETITIVE STRATEGIES

Cluster POWER

By Gary Abramson

The old adage "If you can't beat 'em, join 'em" rings true to proponents of industrial clustering, a strategy that emphasizes business and personal relationships

Common wisdom holds that in this increasingly wired world, distance no longer matters much and nearly any business can now become global. Here is a caveat and a counterproposal: First, making smart geographic choices, whether in the United States or abroad, is getting trickier, not simpler. Second, knowing how to create competitive advantage out of the local business environment is becoming more strategically important than ever.

Choosing the best place to do business nowadays requires much more than just observing those three famed, golden rules of retailing—location, location, location. The rules for the future are really about locating the heart and brains of a business in a specific place for a broader, strategic reason: to create synergies from a complex web of relationships stretching far beyond a single company. It is about synergy from sinking corporate and community roots together in the same location. Because in spite of all the IT innovations that have created global networks, opened up developed and emerging markets, encouraged wave after wave of international mergers and globalized consumer culture, what matters now—and will matter even more in the future—are genuine, tangible relationships.

These relationships include, but go well beyond, the usual notions of supply and value chains. Industrial clusters, as these networks of relationships are known, link competing businesses and competing suppliers with collaborative research institutions, public and private sources of financing, government regulatory and development agencies, and new institutions built for the sole purpose of organizing and energizing these relationships. Clusters could rely on IT to operate across countries or continents. And some are beginning to do so. But the essence of the cluster concept is business and personal relationships that need proximity, continuity and both informal and formal channels of contact in order to flourish.

PHOTO BY JOHN RAE

Marco Zamparini, purchasing director at Yamaha Europe, is head over wheels at the production efficiencies his company gains by clustering with competitors.

"Relatively few companies think overtly about clusters, but that's beginning to change," says Michael Enright, a former Harvard Business School professor currently teaching at the University of Hong Kong and an expert on clusters. "In fact, you find the phenomenon is quite widespread," he says, because many clusters developed naturally—some over decades—before the current wave of strategic cluster formation began. In the most competitive of the developed and emerging market nations, companies that belong to clusters are changing their approaches to product development, manufacturing, marketing, research, recruitment and training.

Partners, Big and Small

Consider the philosophy of Swedish communications giant Ericsson, which has opened a new unit in the multimedia and Internet-content cluster in lower Manhattan known as Silicon Alley. "The reason for us being in Silicon Alley is that we are tapping into the entrepreneurship and the energy of companies that are working here," says Donna Campbell, director of Ericsson's CyberLab, the new 5,000-square-foot rapid prototyping facility that opened in May. The lab is a bridge for startups and smaller companies to partner with the Stockholm, Sweden-based Ericsson, a 100,000 employee company that would otherwise overwhelm such potential allies, she says. Other high-tech companies such as Sun Microsystems Inc., Nokia and Data General Corp. are also among the new arrivals. Ericsson can offer smaller companies its global marketing and distribution talents and brand recognition. "One of the main reasons [for being in Silicon Alley] is to learn and emulate some of the biggest advances that are coming from small entrepreneurs. And that's a reason for physically being here—you have to be part of the community," Campbell says.

Community is a word often used by executives involved in cluster strategy. They're not talking about good citizenship or social action. Instead, cluster strategists see companies as part of an extended business family that pools the resources and benefits of their shared location. Bob Breault, chairman of Breault Research Organization Inc. of Tucson, Ariz., says that thanks to the creation of the Tucson optics cluster, more than 170 small high-tech companies in Arizona can do business with the strength of a multinational. "The global economy is about networking and partnering. But what about a company like mine?" Breault asks. "Individually, it's not [global]. But we go to Thailand or Scotland as a group and say, 'Hey, I've got a billion bucks [in combined revenues].'"

Just as important, he says, is cooperation among competitors who probably wouldn't develop close relationships if they weren't part of the optics cluster. "I got a call yesterday from a fierce competitor—but a friend—in the cluster and he's setting me up next Monday morning for a contract that doesn't fit his bill but fits mine, and we'll do it together. He'll do something for the client, and so will I," Breault says.

By Definition

Clusters: *A system of market and nonmarket links between geographically concentrated companies and institutions. The links enable cooperation among suppliers and competitors on business processes, purchases, investments, strategies and technical research.*

Near Is Better Than Far

Although many of the largest companies are building global networks of suppliers, executives at these companies find that the supply chain innovations that blossom in clusters would probably not develop among companies cooperating over great distances. Yamaha Europe, the Milan, Italy-based motorcycle unit of the Japanese manufacturer, has about a one-third share of Europe's annual sales of 1.2 million scooters. These ubiquitous, low-horsepower motorbikes transport everyone from students to business people through the ancient, narrow streets of European cities. Marco Zamparini, Yamaha's purchasing director, is working with his competitors in

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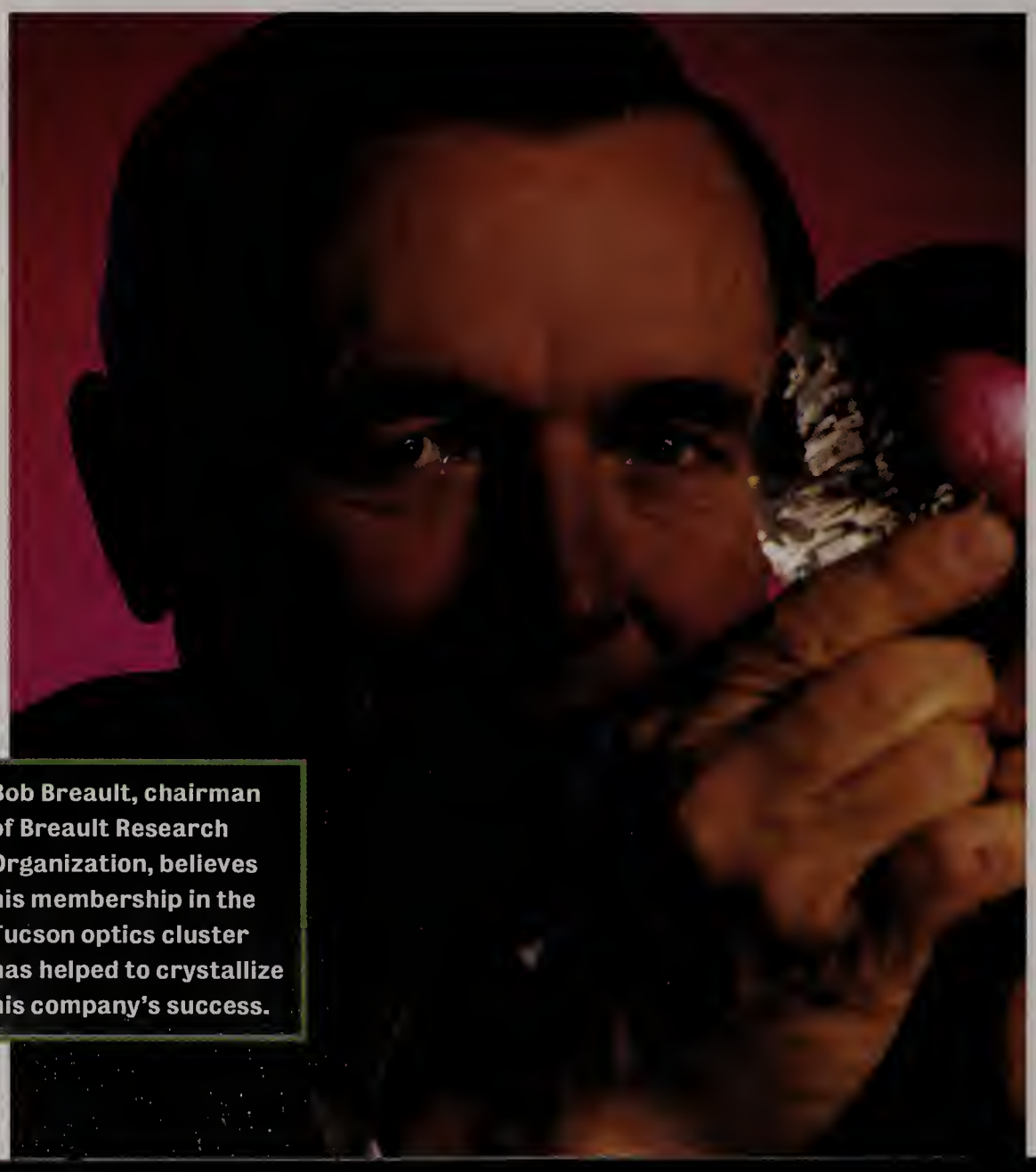
northern Italy—Piaggio, Aprilia and Honda—to share suppliers. Ultimately, they hope to reduce the number of suppliers, which Zamparini says will boost the production efficiencies of the remaining group. The savings from this change will be shared throughout the supply chain. "All of us manufacturers used to work alone. Now I know my colleagues at Honda and Aprilia. If I have a problem I can pick up the phone," Zamparini says. The companies in the European motor scooter cluster are working with Cluster Competitiveness, a consulting firm in Barcelona, Spain. (See "A Cluster Directory" at right.) The firm leads them through the new arrangement and is further boosting cooperation among the competitors by expanding their network outside of Europe. Last November, Zamparini recalls, "All of us visited Honda, Yamaha and Suzuki and their suppliers in Japan, to benchmark how they work with suppliers. Now there is personal feeling between us." When they returned to Italy, they sat down with local suppliers and began discussing how to make some of the improvements in quality, lead time and other production issues that they observed in Japan. Cluster Competitiveness led the Barcelona electronics cluster on a similar knowledge-gathering trip to Singapore.

John Tracy, president of Optipower Corp., a maker of semiconductor diode lasers in Tucson, says that thanks to the optics cluster, his company has developed a relationship with a firm "that designs critical components inside our products. If there hadn't been a cluster and both companies weren't here, would we have found each other? Maybe. But the networking that occurs in cluster activities is pretty valuable—we met at a meeting of the cluster."

Tracy says Optipower, a subsidiary of Spectrophysics Lasers Inc. of Mountain View, Calif., moved from the Los Angeles area to Tucson largely because of the optics cluster. And as the cluster has grown, so has Optipower, from 10 people at its founding five years ago to an estimated 270 by the end of this year.

Government Support

The first clusters, such as leather tanning and textile clusters in Europe, predate the Industrial Revolution by centuries.



Bob Breault, chairman of Breault Research Organization, believes his membership in the Tucson optics cluster has helped to crystallize his company's success.

PHOTO BY DAVID SCHMIDT

A Cluster Directory

U.S GOVERNMENT AGENCIES

- **The U.S. Department of Commerce**
  (*www.doc.gov*)
  The department's Economic Development Agency commissioned a 1997 paper, "Cluster-Based Economic Development," and is monitoring cluster strategy nationwide.

STATE GOVERNMENT AGENCIES

- **Empire State Development**
  Albany, N.Y.
  (*www.empire.state.ny.us*)
- **Connecticut's Industry Cluster and International Division**
  Hartford, Conn.
  (*www.state.ct.us/ecd/clusters/industry.htm*)

INTERNATIONAL ORGANIZATIONS

- **The World Bank Group**
  Washington, D.C.
  (*www.worldbank.org*)
  The bank's Business Environment Group assists countries with cluster strategies.
- **The Organization of Economic Cooperation and Development (OECD)**
  Paris
  (*www.oecd.org*)

CLUSTER CONSULTANTS

- **Cluster Competitiveness**
  Barcelona, Spain
  (*www.clustercom.com*)
  A consulting firm specializing in cluster strategy.
- **ICF Kaiser International Inc.**
  Oakland, Calif.
  (*www.icfkaiser.com*)
  This firm has been engaged in cluster strategy in Silicon Valley, Hong Kong, China, Mexico and Eastern Europe.
- **Competitiveness Network**
  (*www.competitiveness.com*)
  An association of U.S. and foreign consulting firms specializing in clusters.

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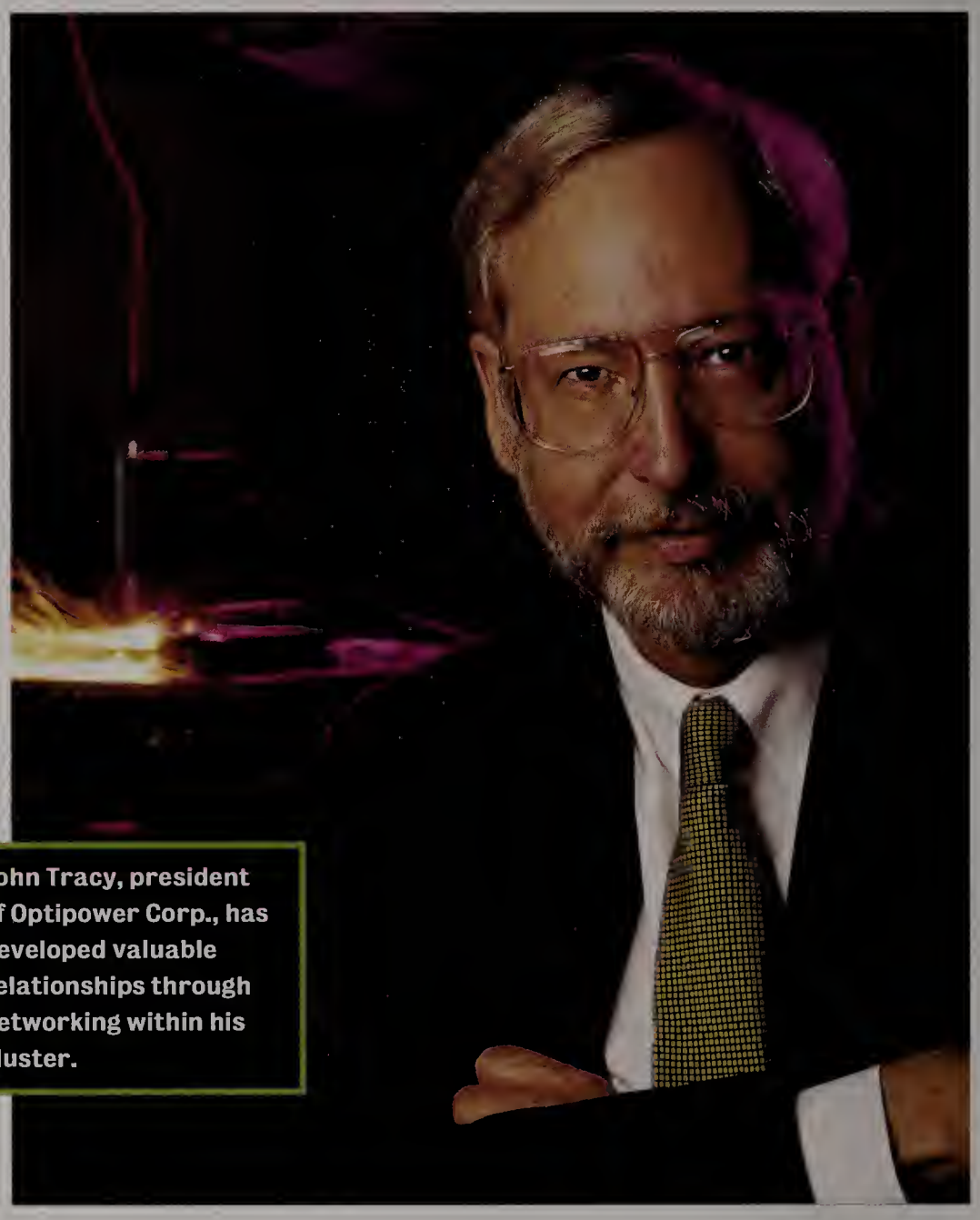


John Tracy, president of Optipower Corp., has developed valuable relationships through networking within his cluster.

Academics, such as Michael E. Porter of Harvard University, began studying cluster strategy a decade ago. But it has only been more recently, at a time when governments from Washington to Paris to Tokyo are looking for ways to give their economies an edge, that clusters have begun drawing substantial attention and money from policymakers and legislators. The U.S. federal government and state legislatures, and national and provincial governments abroad—usually in partnership with the private sector—are working to establish new industrial clusters and strengthen the dozens that exist worldwide. Agencies engaged in cluster policy include the U.S. Commerce Department, the United Nations, the State of New York and the Organization of Economic Cooperation and Development (OECD) in Paris. All want to make clusters a leading tool of companies and industries to foster competitiveness. (See "A Cluster Directory," Page 52.)

As might be expected from a business strategy that attempts to bring the public and private sectors together, government sponsorship or involvement in clusters often meets with skepticism. Like many business people, Bob Breault of the Tucson optics cluster did not know anything about clusters when he was recruited at an economic development meeting of state and university officials and business people in Arizona. "Somebody pointed a finger at me and said, 'You're an example of a cluster [member],' and my dander went up. He could have been saying you're a parasite because I didn't know what a cluster was," Breault recalls. He shied away from similar government approaches for six months before agreeing to become involved. Now he is a self-styled cluster evangelist who has traveled to 15 U.S. states and 13 countries to speak to industry groups about the strategy.

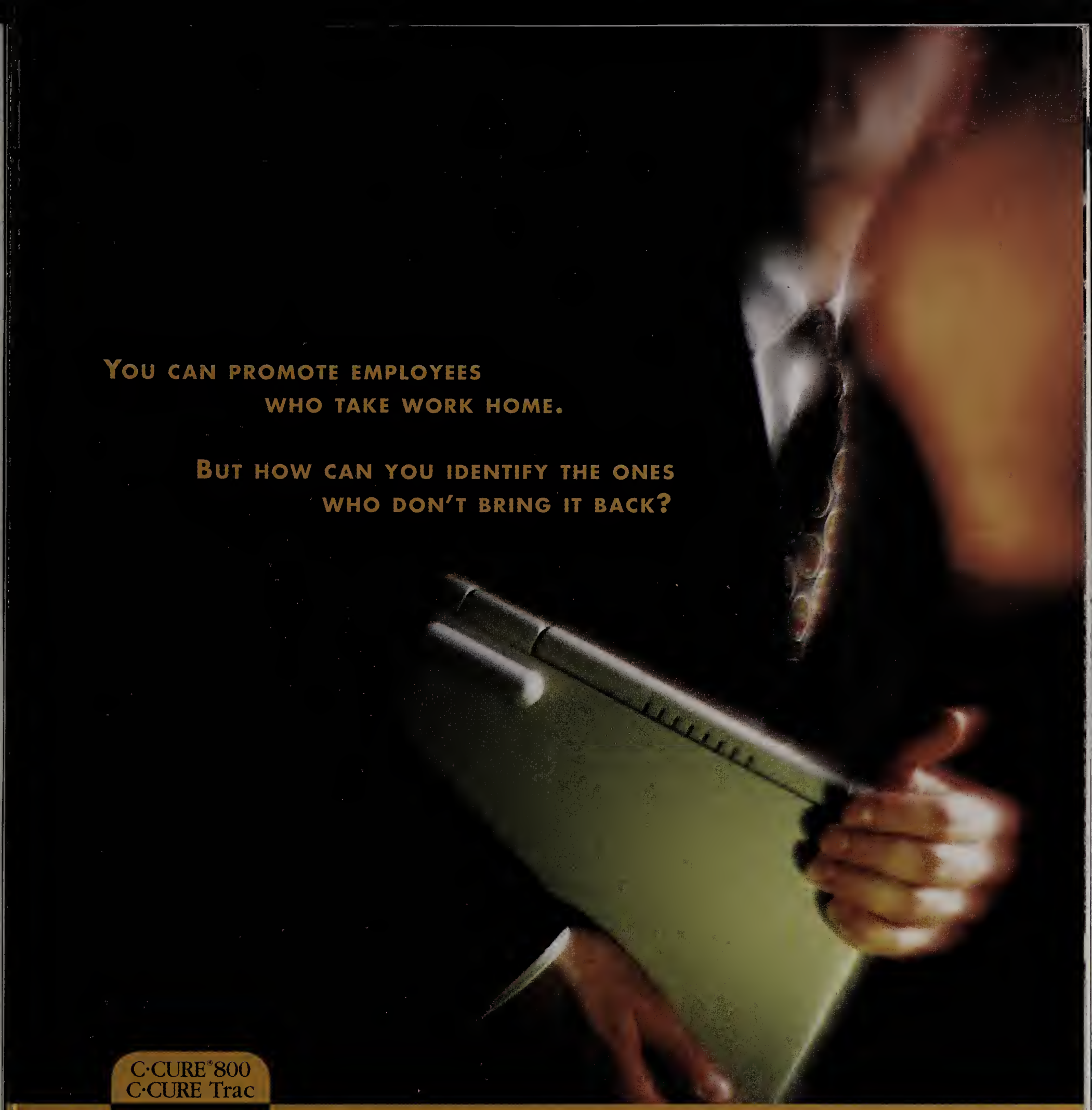
Technology Innovation and Transfer

Brian Bosworth, a principal at Regional Technology Strategies Inc. in Belmont, Mass., is a proponent of clusters who believes that cluster strategy is not yet fulfilling its promise. Along with Breault and other cluster proponents, he advocates greater cooperation among all the institutions involved in the strategy. "The theory is good, but there's a disjuncture between theory and practice. If it is such a good idea for firms within a cluster to realize economies of scale and improve innovation, then why don't those firms seek to optimize these cluster relationships and invest more aggressively in institutions that allow them to explore the underlying technologies that propel all their businesses?" he asks.

Bosworth's call for invigorated cluster organization is being answered in Connecticut, where the state legislature passed a bill this spring to fund the creation of several clusters. One of the co-chairs of the state's manufacturing cluster, one of several pre-existing clusters that has won state government support, is Dan Dechamps, CEO of Trumpf Inc. in Farmington, Conn. Dechamps says his company has already profited from membership in the cluster. Trumpf, a $180 million machine-tool maker, has shortened its cycle time from five days to two by adopting lean manufacturing techniques from another cluster member. "You're less inclined to share business practices if you're not in a cluster that can show you examples of how it's done," says Dechamps. "You have an exchange of what does and doesn't work. The most convincing thing is if you see the result in another company." Dechamps got the lead by attending a cluster-sponsored manufacturing seminar where he met the CEO of West Hartford, Conn.-based Wiremold Co., which gave a presentation. "We are not in the same business, but in substance we have identical problems to overcome. Only our working conditions and prerequisites are different," Dechamps says.

By agreement among business leaders and policymakers, Connecticut's manufacturing cluster is now being broken up into narrower categories, such as aerospace. Dechamps believes this new arrangement will yield further cooperation, such as common purchasing and marketing, between companies within the categories. A lot of suppliers that cater to the same large companies around the world and don't necessarily

PHOTO BY DAVID SCHMIDT



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cooperate with each other now can begin to do so, he says.

But as much as cluster strategy can spawn technological innovation, it can also reveal when technology may not be appropriate. Take the case of some of the original clusters in northern Italy, such as Prato, outside Florence, where about 60,000 companies and 300,000 people work in wool textiles. "That cluster has been there in one form or another since A.D. 1100," says Enright. "What regional governments are doing these days is to recognize that [clusters] exist and through policy either try to create clusters that will be [financially] self-sustaining or accelerate the process [of cluster cooperation]. The irony is that in some of these cases attempts to use information technology [to improve linkages] have failed miserably."

For 12 years, Enright says, the local government in Prato tried to convince all the small businesses to participate in the computerized ordering and information systems that the government had installed. "They ended up being terminals no one used. The information flows were already so efficient, from face-to-face interaction and telephone, that they didn't need them. And relatively few firms wanted to broadcast what they considered sensitive information."

Emiliano Duch hopes that integrating the best companies in clusters will result in pocket-size multinationals.

Brainpower Appeal

Perhaps the most universal magnet that brings businesses into clusters is brainpower. In some cases, clusters have actually been spawned from private sector spinoffs of university research, such as the high-tech clusters in Silicon Valley, Boston's Route 128 and the Tucson optics cluster. These spinoffs were often joined by existing private companies that saw opportunity in the emerging cluster. In a new twist on this pattern, Columbia University, Cornell University and Polytechnic University in Brooklyn have recently opened branches in New York's Silicon Alley to strengthen ties to that cluster.

For some multinational companies, like BASF AG, a $97 billion chemical company based in Ludwigshafen, Germany, location anywhere but in a cluster with a top-notch research base is

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unthinkable. When the German government outlawed genetic engineering a decade ago, the company quickly narrowed its list for a new worldwide biomedical research unit to the San Francisco Bay area and eastern Massachusetts. "We needed a place where the local community had the appropriate attitude toward biotech research," says Robert Kamen, president of BASF Bioresearch Corp., which chose to locate in a biotech industrial park in Worcester, Mass. "The biotech park is here because the University of Massachusetts Medical School is here. The cluster includes the medical school. Some of our staff have adjunct teaching positions with departments there."

The BASF unit relies on the concentration of biotech scientists in the Greater Boston area to assure itself a supply of top talent for its pharmaceutical discovery research in oncology and immunology. "Biotech production is a pretty limited profession. We've recruited mostly out of the local biotech industry," Kamen says.

The Future: Clusters of Clusters?

Despite the success of the cluster strategy, there will likely be a shakeout sometime soon among clusters from different countries that compete in the same industry, says Emiliano Duch, founder of Cluster Competitiveness. So the latest and most difficult twist in cluster strategy will be to link and preserve the best companies in several clusters and get them to work together, he says. Members of the three motor scooter clusters in Spain, Italy and France are the first to participate in a pilot strategy that will attempt to integrate the best companies in these clusters. The project is partially funded by the European Commission, the executive body of the Brussels-based European Union. He predicts similar initiatives for several aviation clusters in Europe.

Because clusters rely on lots of personal contact, that means frequent travel for cluster participants from different countries. "We've had meetings constantly in all three languages," Duch says. The end result, he hopes, will be pocket-size multinationals. In the motor scooter project, the engineering and design will be based in the Bologna cluster, which has the strongest capabilities in that area among the three countries, while the manufacturing will be done in France and Spain. Already, he says, sharing information among three companies within the cluster has reduced the product development cycle time of plastic molds—the time from a designer's sketch to production—to 10 months from a European industry average of 14 to 15 months. "Even the Japanese can't beat that," he says. CIO

Senior Writer Gary Abramson can be reached at gabramson@cio.com.

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CIO 100 the 1998 VALUE CHAIN EXCELLENCE

RISK MANAGEMENT

Beware the WEAK Links

By Carol Hildebrand

Hurricanes, strikes, Y2K—the flood of potential disasters can swamp unwary supply chain partners. Although tightly integrated supply chains yield lower costs and higher profits all around, tighter links mean greater risks if something snaps.

A year ago March the clouds cracked open over the Midwest and poured forth rain for two straight days. As the torrents sluiced down—10 inches in one 24-hour span—the Ohio River roared out of its stream-bed and surged 20 feet above its previous flood level. Homeowners looked on helplessly as their living rooms filled with muck and water. Store owners returned to wrecked shops and ruined wares. And although the river never reached Elizabethtown, Ky., the Dana Corp. plant there still faced a flooding disaster.

"The Ohio River rose to the point where the primary railroad track across the Ohio was blocked," says Michael Green, vice president of structural products for the automotive components group at Toledo-based Dana. "It was almost unthinkable."

Trouble was, nearly all of the light-truck chassis Dana produced for Ford Motor Co. in Elizabethtown were shipped to the automaker via rail, and high demand for the F150 truck had decimated Ford's chassis inventory. "Ford was so busy that sometimes they were unloading rail cars and putting [the chassis] right into the line," says Green. "There were only a few shifts' worth of inventory at their end, which is about a third of what they generally have."

PHOTO BY AP / WIDE WORLD PHOTOS

If Dana couldn't find another way to get those parts to five different Ford assembly plants, the company faced the prospect of "gapping the line," or causing a break in the assembly line. "It's very, very expensive if you shut one of your customers' plants down," says James M. Woodward, Dana's vice president and corporate controller. "For the Big Three, the rule of thumb is that it costs $1 million an hour for shutting down a plant."

Dana prevented what could have been a costly supply chain glitch because it was tied to Ford by a resilient system powered not just by technology but by partner relationships. "At that point, our scheduling people grouped into emergency mode with Ford's logistics people," says Green. The team investigated land itineraries and alternative rail routes and got the railroad to redirect rail cars to replace those stranded by the flood. It was a close call, but all those truck parts made it to the plant on time. "Not a beat was missed," says Green. "It was all total teamwork. It was the only way it could be done, and there was no arguing about it."

Dana's dire straits called for dire measures, but Green is quick to note that his team would never have succeeded had they not laid the foundation for the supply chain partnership long before the Ohio river overran its banks. When the plant first started building chassis, Green says, "We had Ford people in the factory expediting and helping with the Ford ordering system." Truth be told, companies like Dana and Ford need each other now more than ever to cut the risks involved with tightly integrated value chains.

There's no question that when managed wisely, value chains can reduce costs, speed product delivery and cut cycle times. In fact, Donald R. Roden, CEO of Orange, Calif., pharmaceutical and medical surgical supply distributor Bergen Brunswig Corp., says that value chain management has become his company's business. "We do $13 billion a year and handle billions of packages," says Roden. "We're no longer in the distribution business but actually in the business of managing the supply channel. This means not just moving products but managing information and the ultimate cost-effectiveness of that supply channel."

But as the chains linking suppliers, manufacturers, distributors and customers grow ever more intricate, so do the inherent risks. One company's problem could have repercussions through a far wider array of companies and functions than ever before.

James Woodward and Michael Green: Dana Corp. avoided halting Ford's assembly line during a flood thanks to quick collaboration between both companies' logistics teams.

Dana, for example, assembles the chassis for the Chrysler Dakota pickup. "Eighty percent of the chassis consists of non-Dana components," Woodward points out. "We need to manage all the suppliers, assemble the product and deliver it to Chrysler. It gets more and more complicated." Companies like Seattle-based Nordstrom Inc., which manages a supply chain with 13,000 active vendors, 96 stores in 22 states and 6 distribution centers—each big enough to hold more than 100 average-sized homes—need to be at the top of their game to run a top-notch value chain.

Executives must not only worry about acts of God such as floods and earthquakes severing the chain, but they also face less tangible threats. How do you reconcile differing corporate cultures to reach agreement on supply chain issues? What do you do with a partner whose technology is just not up to snuff? And why is a supply chain bully who wants to hog all the benefits hurting itself in the long run? Successful value chain managers know that it's not enough to manage the supply chain internally. They must reach out to partners across the chain. "Those companies doing world-class value chains are looking not just to suppliers and customers but to their suppliers' suppliers and their customers' customers," says Jeffrey Berg, director of Pittiglio Rabin Todd & McGrath, a management consultancy based in Stamford, Conn.

This year's CIO-100 honorees have amassed many thousands of person hours' worth of experience for would-be value chain managers to draw upon. They've identified the following as the greatest risks and challenges involved in building the supply chain and offer tips on how to avert disaster.

Year 2000

Every single executive interviewed for this article put the year 2000 problem, or Y2K, at the top of his or her headache list. Y2K refers to a problem with the two-digit data fields for years in computer code. Many computers will mistake the

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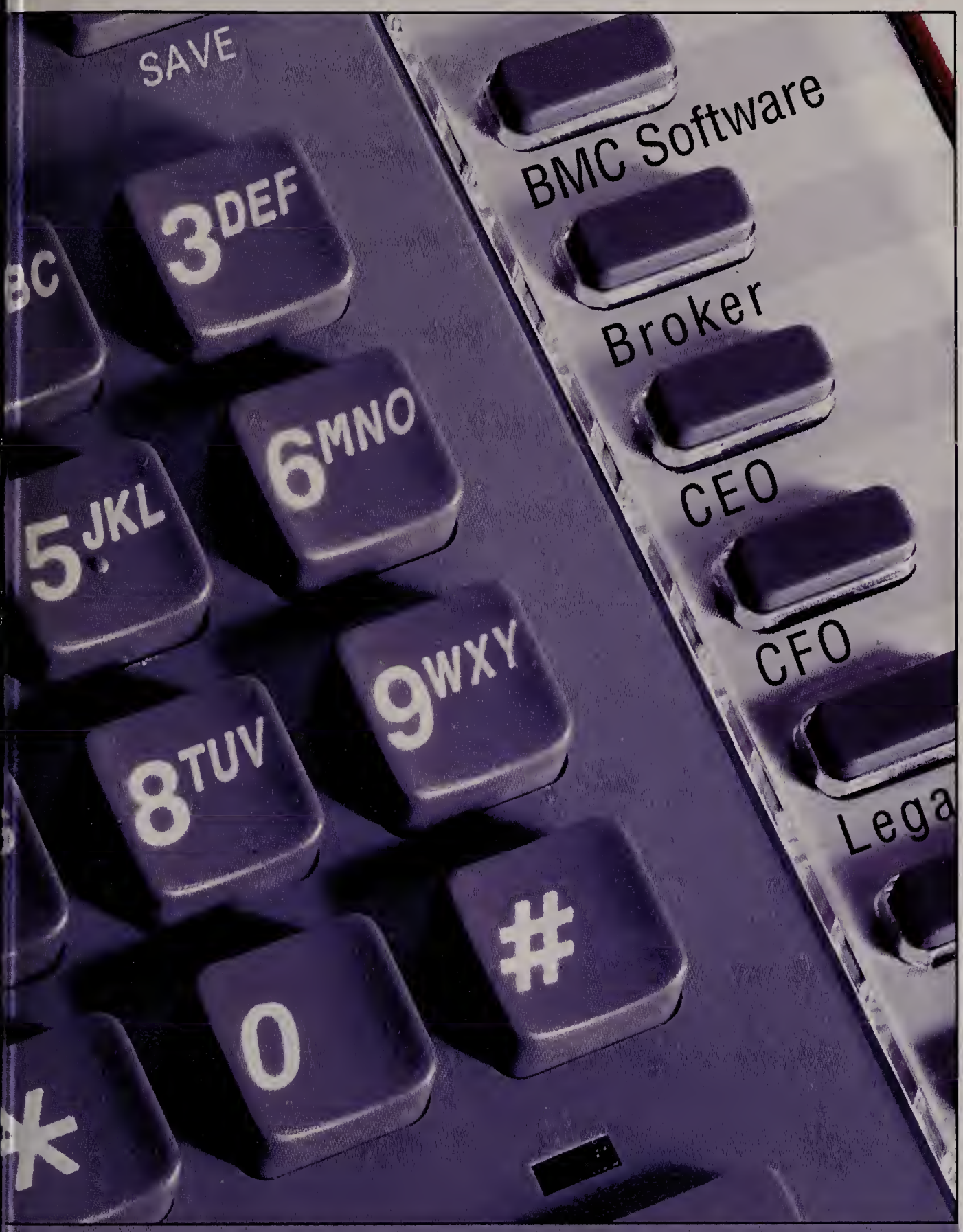

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year 2000 for the year 1900, and experts predict that the resultant glitches could range from malfunctioning ATMs to planes that fall out of the sky. In the case of a value chain, CIOs and other executives must ensure that their own systems are compliant, but they also need to know that each company in that supply chain has addressed the issue. Noncompliant data anywhere in a system is bound to cause problems.

"This is a huge issue for supply chains," says Bergen Brunswig CIO Linda Burkett. "How do you make sure that your whole supply network is Y2K compliant? Who's in charge? How integrated is the effort?"

The Home Depot Inc. in Atlanta has been working on Y2K since 1990, but Ron Griffin, senior vice president of information services, chiefly worries about the compliance of his suppliers, whose manufacturing systems rely on older embedded code. "Say that somebody has a highly automated manufacturing system and [Y2K] shuts it down," he hypothesizes. "If we can't get product from them, it has a material effect on us." Griffin brought in Home Depot's chairman, Bernie Marcus, to drive the message home. "He's sort of a spokesman to get the suppliers to really take it seriously," says Griffin. All the Y2K surveys and letters sent to suppliers are signed by the chairman, and he brings it up in speeches, too. "We just had a meeting about Y2K with many vendors present," Griffin says. "Our chairman admonished them that they had to not only check their systems but make sure that all of their suppliers were ready as well," he says. Griffin also serves on an executive steering committee for Y2K problems, which includes the senior vice presidents of finance and merchandise, the chief administrative officer, the vice president of merchandise payables and the senior vice president of operations. "It's a business concern, not just a technology concern," he says.

"The better the information is, the more we all benefit. Everybody makes more money by participating."
–James Woodward

Like most companies, Home Depot has surveyed its suppliers about their Y2K plans, and the responses vary widely, says Griffin. "Some companies are ready, and some are just waking up to the fact that they need to do something. So we're developing contingency plans around those companies that we feel are high risk." Griffin's group plans to spend all of 1999 testing and auditing suppliers for readiness, as does Charles Mitchell, Nordstrom's vice president of business information and technology services, who estimates that his company will spend about $19 million on Y2K issues. "We need to finish our own work this year so we can handle the problems of other people as they come along," he says.

Sharing Supply Chain Wealth

A supply chain is only as strong as its weakest link, and there will inevitably be smaller, weaker members of any such chain. But smart supply chain implementers will make sure that the smaller companies are not treated as second-class citizens. Yes it can be difficult. Smaller companies may not have the financial wherewithal to reach technical parity with the richer members of the chain gang. And bigger members may be tempted to reap all the financial benefits of some new supply chain innovation. But in the long run, most executives say that sharing the wealth invests all the members with a desire to see the chain succeed.

"Ultimately we're not alone in this," says Woodward. "The better the information is, the more we all benefit, and it gets passed on as lower prices to the end customer. Everybody makes more money by participating."

"We succeed when our partners do," says Carmine J. Villani, corporate vice president and CIO at McKesson Corp.,

Anticipating Disaster

Awake, awake! Fear, fire, foes!

THEY MAY NOT NEED THE DISTRESS CALL OF THE BRANDYBUCKS, BUT executives do take a leaf from the inhabitants of J.R.R. Tolkien's Middle Earth and practice disaster prevention for their value chains. It's primarily a matter of contingency planning, says Donald Roden, the CEO of Bergen Brunswig Corp. "Whether it's Mother Nature or a commercial interruption, we try to anticipate, monitor and stay ahead of the problem," he says.

Most of the time, Bergen Brunswig's methods work: Roden says that the pharmaceutical distributor suffered no effects of the UPS strike, even though UPS was its primary courier. "We could see that strike coming," he says. "If distribution is critical to your business, you monitor things like that." Roden says the company used a mixture of more in-house drivers and had its secondary courier poised to step in and take delivery, as it were.

However, when AT&T Corp.'s frame-relay network, a high-speed network for transmitting data, shut down for more than 24 hours last April, the company had no warning. But Bergen Brunswig customers didn't care that AT&T had a breakdown; to them, it was Bergen Brunswig's problem. "I can tell you that we have our own backup system now," says Roden. "If it's unanticipated, we can be taken by surprise; but it won't take us by surprise a second time."

Ron Griffin, The Home Depot Inc.'s senior vice president of information services, says that most of his stores have backup power generators and emergency procedures in place that let the retailer do business in the face of power outages. But like Roden, "We learned what it's like to be without phones when the AT&T frame relay went out." Fortunately, Home Depot was able to continue to do business. "So long as we can get product into stores and have a cigar box to put the cash in, we can basically stay in business," he points out. "Retail is relatively low risk." *–C. Hildebrand*

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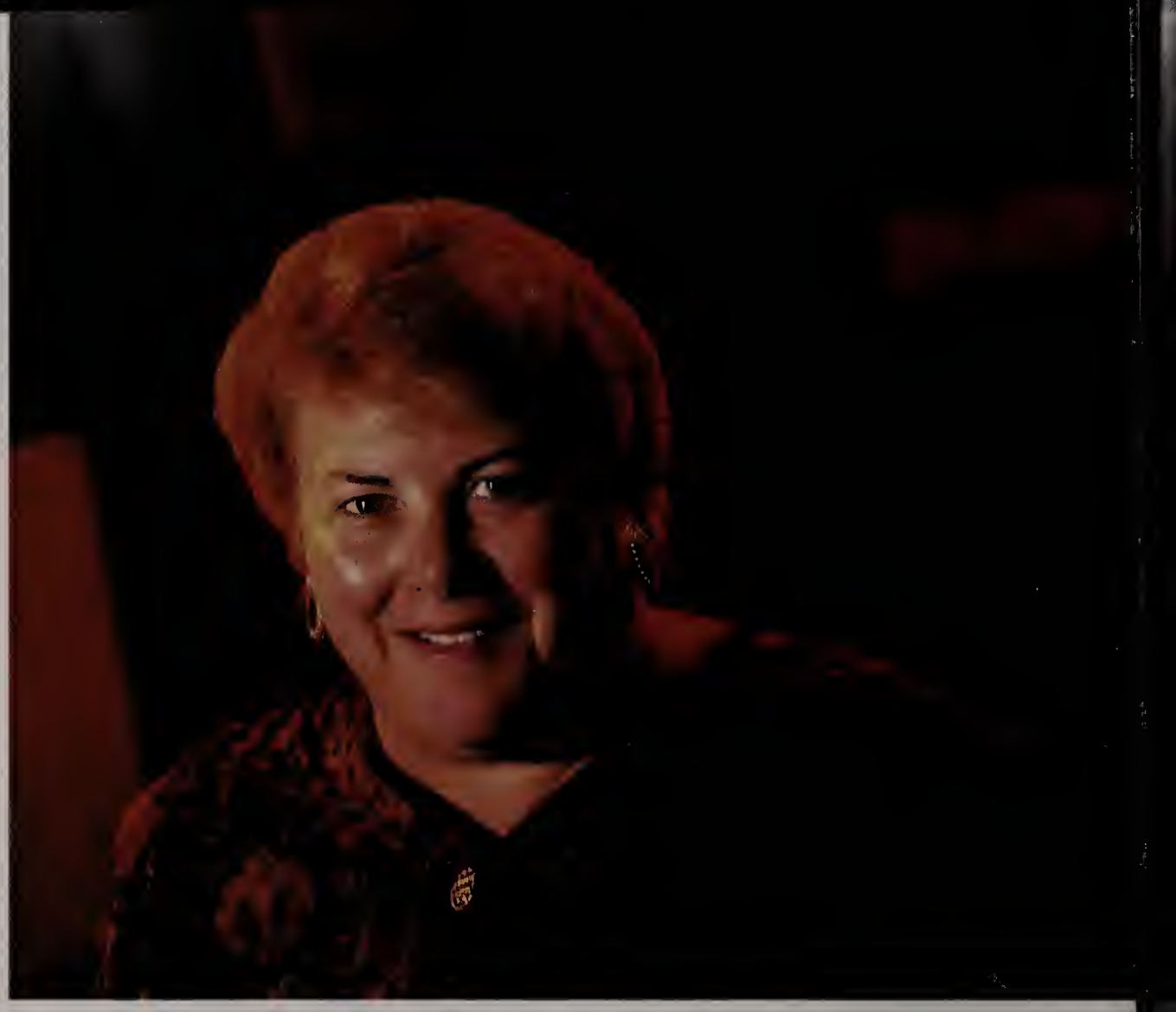
a San Francisco-based pharmaceutical and medical supplies distributor. "We are not into throwing our demands over the wall at partners. We literally want to sit down with them and make sure that everybody's needs are satisfied."

Sharing the wealth can take many forms. Sometimes, says Villani, his company will donate money or people to make sure that supply chain partners have the right technology. "We've had situations where a partner didn't have the technical skills or funding to take advantage of our automated resupplying capability [which lets customers order online]," he says. "We've stepped in and provided them with skills and funding to build a solution, and we were both then able to take advantage of cost savings." Sure, McKesson is not acting out of altruism—it wants to save money, too. But then again, the company knows that a partner that's been helped rather than left on its own is one that may eventually return the favor.

Bergen Brunswig's Burkett confirms that mutual give-and-take helps forge a stronger supply chain. In building the actual systems, "We do a lot of bending to accommodate the other companies," she says. The IS group tries to fit its technology to the supplier's, even if Burkett's folks think they have better technology. As she puts it, "We put our egos in check for the overall good of the company."

Villani points out that adapting to a partner's system may cost money up front, "but our belief is that if it's really optimizing the industry and taking costs out, then everybody succeeds."

The more willing partners are to share information, the greater the chance to wring more money and time out of the product cycle. Dana's supply chain extends all the way into product design at some companies, says Woodward. For example, Dana gives Chrysler's design team input on how to save money on parts while the cars are still on paper rather than offering such suggestions after the vehicle designs have progressed to the manufacturing floor where it's more expensive to make changes. Dana solicits the same input from its own suppliers. "Usually we share the cost savings, although it depends on the amount of effort on each partner's part to effect the change," he says.



CIO Linda Burkett: Bergen Brunswig's IS team always tries to fit its technology to the supplier's.

Sharing financial benefits is an important success factor for many companies. Bergen Brunswig, for example, signs performance-based contracts with many customers. If Bergen Brunswig manages to reduce supply chain costs by, say, 10 percent, Bergen splits the cost savings with the customer, says Roden. "It helps companies work on a team more because they benefit as much as do we. If we kept it all, the customer has no incentive to contribute."

Home Depot will even go so far as to help suppliers get manufacturing loans. "If banks know that Home Depot is backing up this company and wants to buy the product, it may help get the investment," he says. In return, the home-supply giant wins a loyal supplier to fuel its rapid expansion. "We've been growing at 23 percent to 25 percent a year," says Griffin. "With that growth rate, long-term product availability is a critical element."

Information Distortion

Corporate information distortion works like an updated version of Telephone, the parlor game in which a message whispered from one person to another becomes hopelessly garbled as it travels. Information can get quite distorted from its original form as it moves through the value chain, and costly errors can result, says CIO-100 judge Hau L. Lee, Stanford University professor and director of the Stanford Global Supply Chain Management Forum. "Because of information distortion, companies can over- or underinvest in manufacturing capacity and inventory or pay overtime that they don't need to," he says. What's more, he says, information distortion grows more pronounced as it moves upstream and away from actual market demand. Lee cites four major reasons for information distortion:

Signal inflation: People make forecasts based on some trend or signal, and it gets adjusted up the line. Thus, someone could hear that demand will go up 10 percent. That person decides to tack on another 5 percent to make sure. As the forecast moves up the supply chain, others do the same thing, inflating the actual market demand.

Supply fluctuations: "People react drastically when they see things like price cuts [in materials]," says Lee. They order a tremendous amount. And because of a lack of integrated information, suppliers further up the supply chain may not know about the price cut. They just see the manufacturer buying four times more material and react accordingly.

Shortage overreaction: Lee cites printers as an example. Customers order 50 printers, say, and receive only 35. So they think, "I'll double the order next time

PHOTO BY LARA REGAN

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and end up with the amount I want." Suppliers don't know if they are filling phantom orders or orders generated by real demand. "What starts as a shortage, or the perception of a shortage, eventually ends up as an oversupply," says Lee.

Bergen Brunswig CEO Donald Roden: "We're in the business of managing the supply channel."

Uneven ordering: "When companies don't order frequently for whatever reason suppliers don't get good information," says Lee. "It becomes a shock to [the ordering] system and makes it difficult to read the market because there's always uncertainly about what orders are going to come in."

Lee says that companies such as Wal-Mart, Procter & Gamble and Hewlett-Packard successfully battle information distortion by disseminating real market demand data across the supply chain. "It's a really fundamental step," he says. "Unless you have good information coming in, how can you create the best response?"

For example, Lee says that Wal-Mart supplies P&G with point of sale information. That way, he says, "P&G can see what's actually going on and won't be fooled by information distortion. In extreme cases, they can replenish supply based on that information, not on the distorted orders coming in." HP also asks suppliers to share actual market data, he says.

Some companies, such as Saturn Corp., have stabilized prices to avoid overordering triggered by price cuts. Others have adopted low-cost ordering techniques like the Web and electronic data interchange (EDI) to encourage more frequent ordering and give their suppliers and customers a much clearer picture of what their market is like, says Lee.

Technological Complacency

You finally did it—hooked all the suppliers and customers into the supply chain and integrated it across all the corporate functions. Time to heave a gusty sigh of relief and hang a Gone Fishin' sign on the office door, right? Nope.

Building a high-performance supply chain system means that "the job is never done," says Albert H. Segars, an associate professor at the University of North Carolina's Kenan-Flagler Business School and a CIO-100 judge. "With the technical and business environment always changing, companies must constantly look for ways to improve."

"It's a major priority for us," says Villani. "Having modern, up-to-date technology is something we have to do because our customers ask for it." For example, McKesson developed a system enabling Internet ordering because it was a condition of doing business with the Department of Defense.

In fact, Villani has a full-time vice president of technology whose sole responsibility is to scout out and choose promising new technology. "He reports directly to me," says Villani. "It's very difficult for me to manage day-to-day things and still stay current with what's going on [with new technologies]."

Dana avoids technology complacency through a consensus approach that involves high-level business leaders, such as Dana's international business unit president and the credit president. "Our business dictates our technology involvement," says Woodward. "When you have inventory that equals 2.5 percent of sales and products going in and out within hours, the underlying information technology becomes critical."

Dana's technology guidelines come from the company's Global IT council, which reports to a policy committee made up of the top five officers at Dana. Woodward says that direct involvement by senior business executives helps his company avoid the "technology for technology's sake" syndrome. "We've learned over time that there has to be a good business case for technology," he says.

Supply chains can run afoul of anything from a plague of locusts that devastates a supplier's raw material to a customer that refuses to fix a faulty order-entry system. While the bugs may grab more headlines, the threat posed by the recalcitrant customer is just as real. And smart supply chain managers will have a plan to deal with both. CIO

Senior Editor Carol Hildebrand can be reached at cjh@cio.com.

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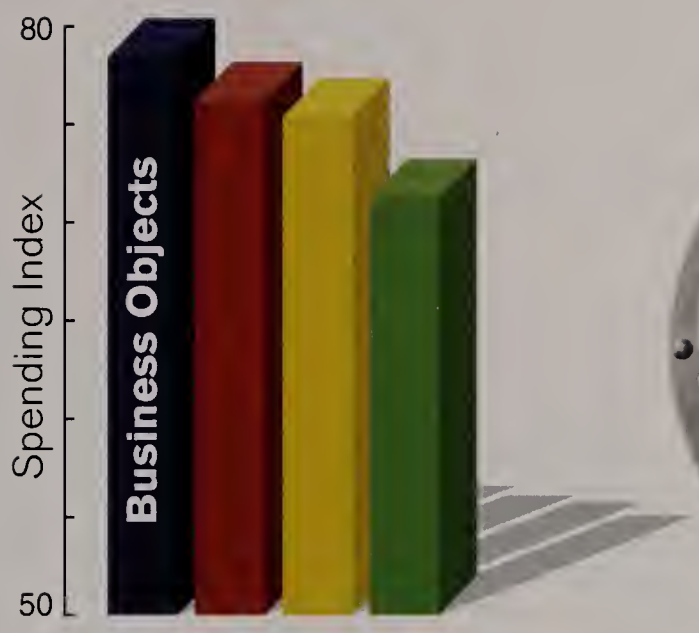

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M. Hall Gregg (left), executive director of biomedical IS, and Thomas H. Woteki, VP and CIO, reflect on the American Red Cross's transformation to a centralized blood management system.

The Red Cross Through Time

1863
International Committee of the Red Cross organizes in Geneva

1881
Clara Barton founds American Association of the Red Cross in Washington, D.C.; first chapter opens in Dansville, N.Y.

1941
American Red Cross establishes blood and plasma program; volunteers collect 13 million units of blood for troops in World War II

1947
Red Cross launches nationwide civilian blood program

1948
First Red Cross blood-donor center opens in Rochester, N.Y.

1968
Red Cross establishes rare-blood program

1985
All Red Cross regions begin testing blood donations to detect the HIV virus that causes AIDS

CIO 100 the 1998 VALUE CHAIN EXCELLENCE

PROFILE: NONPROFIT

IMPROVED Circulation

This year's CIO-100 honorees are all profit-oriented enterprises. But, of course, many nonprofits excel at supply chain management as well. Among the leaders: the American Red Cross, which collects, processes and distributes thousands of units of human blood every day.

BY ANNE STUART

PHOTO BY WALTER CALAHAN

1991

Elizabeth Dole becomes ARC president; agency launches $287 million, seven-year effort, "Transformation," to overhaul blood handling process

1998

Transformation nears completion with ongoing consolidation of 28 regional computer systems into a single national system

After Elizabeth Dole took over as president of the American Red Cross in 1991, she had just one word for the organization's Blood Services division: transformation. Make that four words: complete, total, utter transformation. The Red Cross Blood Services division had handled blood in much the same decentralized way for decades. Oh sure, there had been technological improvements over the years: some automation, new products, better tracking of rare blood-type donors and, in the wake of the AIDS crisis, ever more vigilant and sophisticated procedures to test for infectious diseases (see "The Red Cross Through Time," Page 68).

But the division's underlying structure—based on local rather than national control—hadn't changed much. Meanwhile, the scope of the Red Cross's life-and-death mission mushroomed: Today the organization annually spends $1.3 billion to collect 6 million units of blood, test it for a variety of diseases, distribute some to hospitals for transfusions and manufacture the rest into blood products such as plasma, platelets and white cells.

As a result, by the early 1990s the Red Cross's blood-products business depended on a computer network with more loops than the human circulatory system. Twenty-eight separate computer systems served the nation's 38 Red Cross blood services regions. Although all the systems were subject to the same U.S. Food and Drug Administration (FDA) regulations, each was managed independently. Each region developed its own (sometimes redundant, sometimes contradictory) procedures. There was little national collaboration or leadership. "The regions were basically autonomous units flying under a corporate flag called The American Red Cross," says Red Cross CIO and Vice President Thomas H. Woteki.

With Dole's blessing, in 1991 the Red Cross launched a seven-year, $287 million effort to overhaul and upgrade the management, operations and technology that supports the processing of nearly half the nation's supply of life-giving human blood. (The Blood Services division accounts for most of Biomedical Services, one of the American Red Cross's two lines of business; the other, Chapter Services, oversees local safety and health educational programs and disaster relief efforts.)

Dole appointed a new Biomedical Services management team consisting of a senior vice president, CIO, COO, CFO, and other vice presidents and executives: all new positions, some filled by insiders, some by newcomers. That group, in turn, centralized operations. Under its direction, the Red Cross replaced more than 50 scattered blood-testing facilities with 8 state-of-the-art National Testing laboratories, launched new national quality-assurance and interactive distance-training programs, and set up a national inventory-management system to make sure blood products are consistently available nationwide. Now as the humanitarian organization marks its 50th year in the civilian blood-banking business, the overhaul—still called simply "Transformation"—is nearing completion.

But the biggest piece of Transformation remains underway. That's the gradual conversion of those 28 regional computer systems to a single artery: the National Biomedical Computer System (NBCS) based at the Red Cross's national headquarters in Falls Church, Va.

This IT component of Transformation was also the most risky: The Red Cross had previously tried—and failed—to consolidate the systems that track blood from donation to hospital delivery. What had changed? "The management attention and focus that was put on it," says Woteki. Armed with Dole's mandate, Biomedical Services Senior Vice President Jim Ross sent a clear message to both the business and the IT sides: It was high time to simplify, streamline and standardize every aspect of the way the Red Cross collected, tested, processed and distributed blood and blood products. "He made it a priority in the organization: 'We will do this, we can do this, we will manage it and we will be successful,'" Woteki recalls. "He left no room for argument."

But convincing the regions was a tougher sell. As Woteki puts it, "Getting people to think about themselves as part of a national organization—as opposed to 'We're the Greater Ozarks chapter out here and you guys in corporate don't know anything'—is a real change." Nowhere was that more true than with regional CEOs, who, even while sometimes complaining about having to manage IS,

Red Cross Gets A+ in Birmingham

BLOOD DONORS IN BIRMINGHAM, ALA., WERE GETTING A BIT belligerent. What got their blood boiling were those American Red Cross calls recruiting them to give "the gift of life" when in fact they'd donated a unit of blood the previous day or just a week or two earlier. Even if they were willing to do so, the Red Cross's own regulations prohibited them from donating again for a while.

Regional Red Cross managers were distressed but not surprised to hear they'd been annoying the people they most wanted to please. And they knew exactly why it happened: They updated donor lists about once a month, when they felt they could briefly divert resources from more pressing tasks. "Sometimes we called [donors] four or five times before the lists were updated," acknowledges June Fletcher, CEO of the Alabama Region, which serves 55 Northern Alabama hospitals.

But that has all changed since the region abandoned its in-house network to join the Red Cross's National Biomedical Computer System (NBCS). Now donor lists are updated daily, allowing recruiters to concentrate their efforts on finding truly eligible donors. Fletcher attributes a 10 percent increase in blood donations in the past year to the newly efficient system.

The system also lets managers automatically compile information that they used to gather by hand, such as the number of blood units rejected during a given period. That's of concern because collecting blood that can't be used wastes time and money. "Now we're able to get this information and act on it, whereas before it cost so much to get manually that it wasn't worth it," says Fletcher. Having access to that information allows her to pinpoint whether the rejection was a one-time shot or whether it was caused by personnel errors, gaps in training or problems on a particular blood drive.

Before the Alabama Region joined NBCS in July 1997, it had up to a dozen people assigned to satisfying U.S. Food and Drug Administration regulations, responsible for tasks such as keeping records, writing codes and procedures, validating changes, managing hardware and doing documentation. Those IS employees wrote their own software, codes and procedures, all constantly ripe for review or inspection.

And now? "We don't really have anybody devoted to it because it is done at the national level," Fletcher says. "Going to a standardized system allows us to get back to what we do: collect and distribute blood products in this area."

Was there initial resistance to giving up local IS control? "Sure," Fletcher says. "But by the time we got to the day [of the changeover], everybody was so excited. We would have had a massive revolt if we had not gone ahead and converted."

–A. Stuart

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viewed the task as part of their job descriptions. "When we changed things and said we're going to manage IS centrally, they felt they were losing a piece of their charter," Woteki says.

Those earlier failed consolidation attempts didn't help, either. Woteki sums up the typical regional response to the centralization proposal this way: "'We've tried this before. We can't do it. We won't do it. We won't stick it out. Management will give up. Why don't you just leave us alone?'"

Meanwhile, the FDA added another hurdle by deciding to regulate not only blood products but the software that processes them. "That was an added challenge during our initial development phase because we had to be even more conscientious about documentation and content," says Woteki's deputy, M. Hall Gregg, executive director of biomedical IS. (For more on the Woteki-Gregg partnership, see "Dynamic Duos," *CIO*, Nov. 15, 1996.)

For many regions, these FDA regulations were the last straw and they realized something had to give. Many wanted to strengthen the first link in the supply chain—donor recruitment—but couldn't because they were busy managing IS links further down the line. "We did not have the resources here to do anything but stay in compliance [with FDA regulations]," says June Fletcher, CEO of the Alabama Region, which serves 55 hospitals in the northern part of the state. "We did not have the resources to develop management tools, to recruit donors," or do much beyond run the business day to day. (See "Red Cross Gets A+ in Birmingham," Page 70.)

SO FAR, NBCS HAS MANAGED TO SATISFY BOTH its regulators and its customers, the 25 or so regions that have converted to the centralized approach since its launch in August 1996 (all are scheduled to join NBCS by February 1999). The Biomedical Services management team cultivated acceptance from the regions by soliciting their input from the start, Gregg says. "We assembled a team of subject-matter experts from our staff around the country," she explains. "They spent time visiting regions and documenting Red Cross best practices. Then they came back and developed the standard manufacturing process. We integrated that with the system requirements."

The result: a centralized IT system and supporting business practices that standardize everything from maintaining donor histories to labeling units of blood, increasing efficiency and cutting costs while improving product quality. NBCS allows the Red Cross to adapt faster to shifting conditions—including FDA regulations—because changes affect only one system.

Woteki and Gregg emphasize that even before NBCS the Red Cross painstakingly tracked donations from donor to distribution, including each unit of blood and any products created from it. Each donation underwent testing for a variety of infectious diseases. Labeling was handled differently from system to system, some requiring more manual authorization than others. NBCS now standardizes and refines that process by adding more checkpoints and improving cross-referencing to spot donors' name or address changes or potential problems, such as donors previously rejected because of recent travel to countries with high rates of infectious diseases.

The new system also provides features many regions lacked. For example, regional centers can now build telephone recruit-

Corporate Thumbnail

American Red Cross

Mission: Nonprofit organization providing disaster relief; health and safety programs; and blood and tissue collection, testing, processing and distribution

Founded: 1881

Headquarters: Falls Church, Va.

Lines of business: Biomedical (including blood/tissue banks/plasma); chapter services (including disaster relief/health and safety)

Annual budget: $1.8 billion ($1.3 billion of which goes to biomedical, including Blood Services)

Staff: Nearly 30,000

Volunteers: 1.3 million

Blood donors: 4.5 million

Local chapters: 1,300 (plus overseas military stations)

Blood services regions: 38

Annual blood collection: Approximately 6 million pints (almost half of the U.S. supply)

Hospitals served: 3,000 nationwide

Web sites: American Red Cross (*www.redcross.org*); disaster relief news, a CNN/IBM partnership (*www.disasterrelief.org*)

Technology Thumbnail

American Red Cross National Biomedical Computer System (NBCS)

Launched: Aug. 12, 1996, with Farmington, Conn., Blood Services region

Application servers: IBM RS/6000 processors

File servers: Compaq ProLiant 300R servers

Network hardware: Cisco routers and switches; Cabletron hubs

Network services: AT&T frame relay and ISDN; AT&T frame relay

Network maintenance services: NCR

Application software: Modified, rehosted off-the-shelf application for blood processing and distribution

System software: Oracle RDBMS, IBM's AIX, Windows NT server

Data storage: EMC's Symmetrix 2000 Family Enterprise

Storage systems: Symmetrix Manager

Data warehousing: NCR's TeraData RDBMS powered by NCR hardware

Disaster recovery site: AT&T DS-3 connects the primary (Washington, D.C.) site with the secondary (Philadelphia) site; EMC's Symmetrix Remote Data Facility (SRDF) provides mirroring of data between the sites

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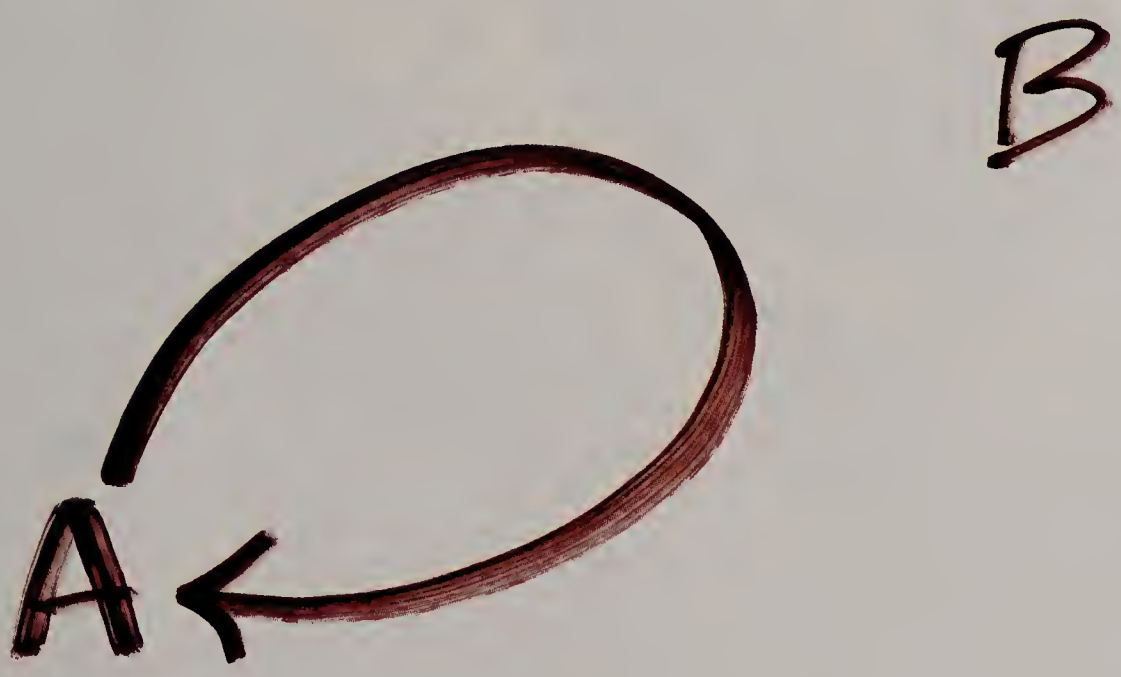

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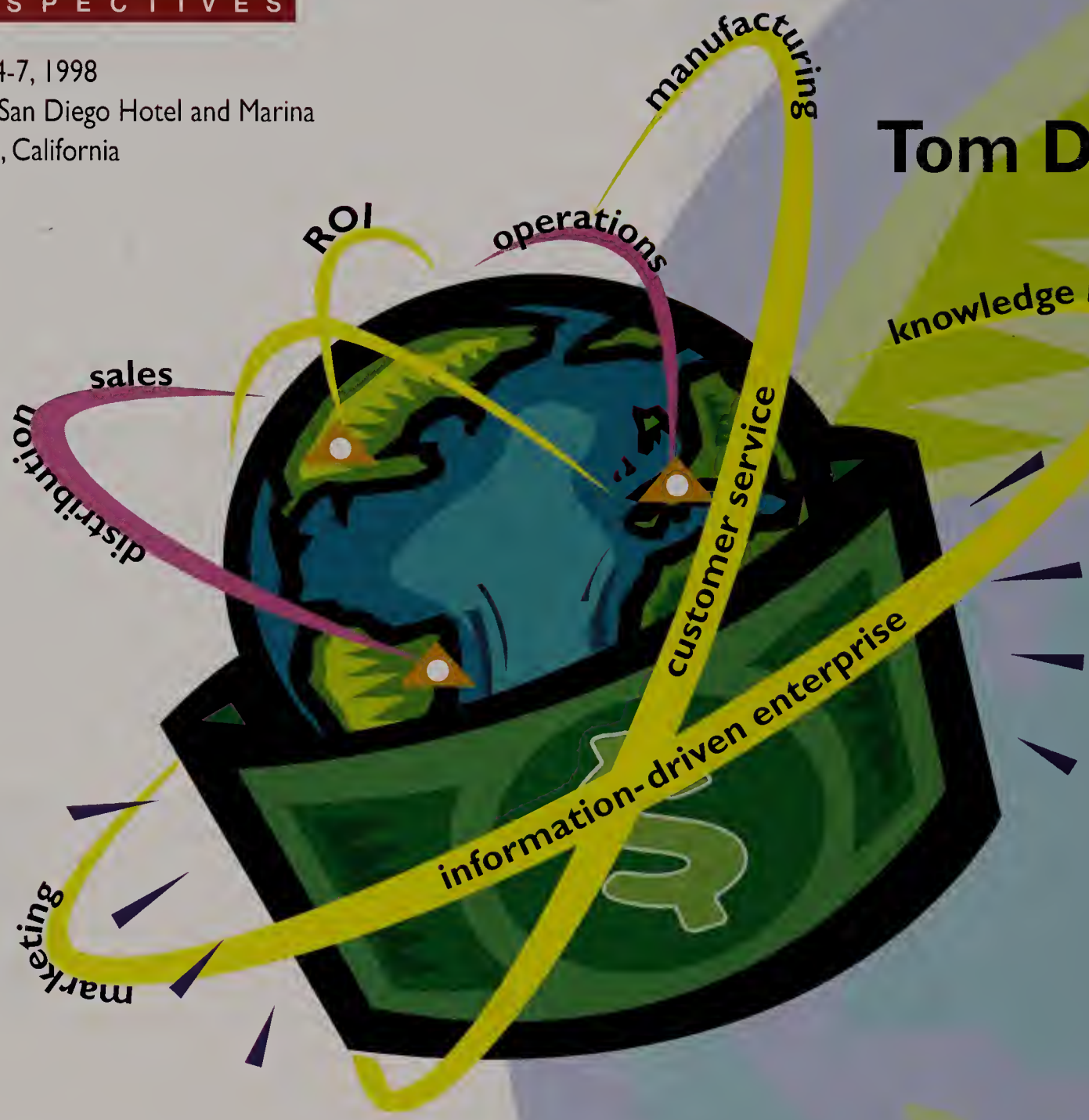

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ing lists by ZIP code, allowing regions to target a particular neighborhood for a blood drive. They can save and preprint donation records so that repeat donors don't have to fill out the same forms whenever they give blood. They can automate donor scheduling. And when rigorous tests reject a unit of blood because of a health problem—the presence of hepatitis or the HIV virus, for instance—the system automatically generates a letter advising the donor to see a doctor.

BEFORE NBCS, TECHNICAL DUPLICATION WAS rampant. "We had eight development centers, all maintaining what was essentially the same application, but in different languages, in different places and on different hardware platforms," Woteki says. "That's been eliminated." Gone, too, are the "hornet's nests" of customized operating procedures covering every aspect of the blood-supply process in each region. "The headquarters here would write an operating procedure, known as a blood directive," Woteki explains. "Because we had no [IT] standardization, each region would have to write a local operating procedure that covered their peculiar circumstances" related to the national directive. Every year, regions racked up hundreds of new localized procedures. But as regions go online with NBCS, those procedures become history—along with the drag on the resources that came with creating and maintaining them. The 38 regions balance their own demand and supply, but a nationwide inventory-management hub based in St. Louis keeps Red Cross headquarters up to date on shortages so that regions can pitch in as needed. And the organization maintains a nationwide database on donors of rare blood types. NBCS offers users a 24-hour help desk based at Red Cross headquarters. Regional users call in with questions or complaints, and the system tracks all calls to make sure problems get resolved. Help desk staffers, who undergo six weeks of training before soloing on crisis calls, handle about 1,200 calls a month.

The Red Cross is likely to win over even the most recalcitrant regions by offering more backup and disaster recovery capability than they could afford on their own. A prime example: When the AT&T network crashed for 24 hours last spring, the NBCS seamlessly rolled over to ISDN backup within minutes. "We had to ask regions to shut down certain noncritical applications," Woteki says. "So they slowed down their recruitment activities a little bit. But we stayed in business."

All of that has added up to overwhelming acceptance from the once skeptical regional users, the biomedical management team says. "I don't want to oversell the project. But I think it's contributed to more positive thinking: 'If we pull together and play as a team, we can do some amazing things,'" Woteki says. "That can only serve us well." CIO

Managing Editor Anne Stuart can be reached via e-mail at astuart@cio.com.

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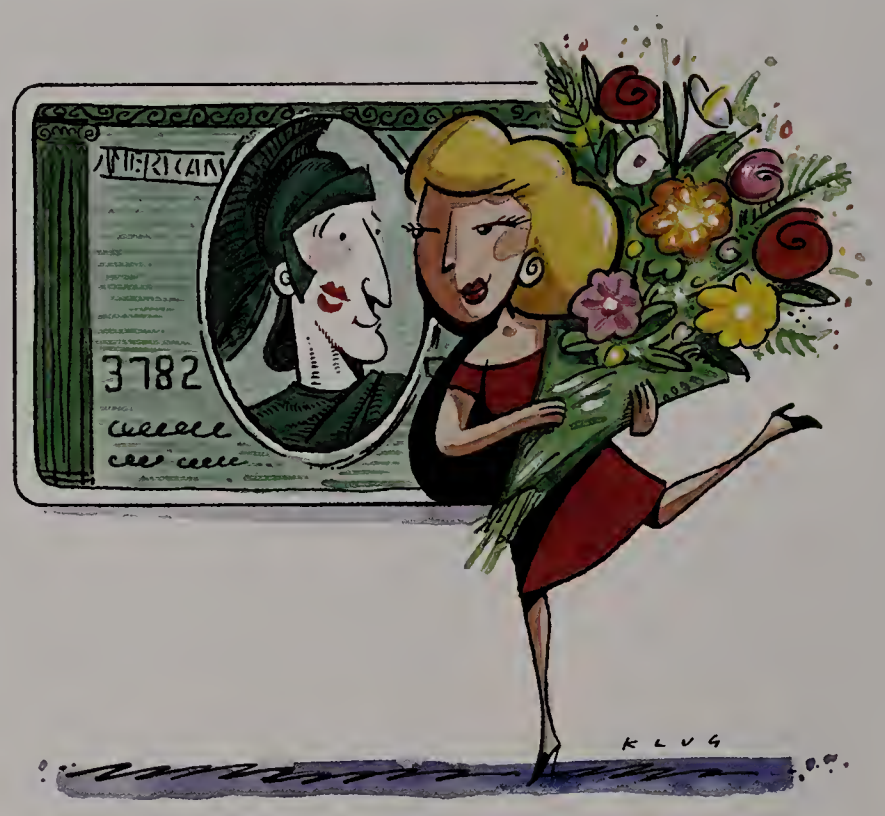
On the Money

American Express builds customer loyalty by printing targeted offers on customers' bills

BY LOUISE FICKEL

MARK WEBER RARELY HAS TIME TO READ his mail. As marketing support manager for an environmental engineering firm in Atlanta, Weber often works 70 hours per week. So when Saturday arrives, he tackles all of the mail that has piled up during the week.

On a recent Saturday, one item caught his eye—his monthly billing statement from American Express Co. Normally, he quickly scans bills and puts them aside for payment. This statement, however, intrigued him because it offered a discount from his local florist. Weber had charged flowers there for a relative's funeral, which triggered American Express's billing system to print the offer on his statement. "This makes a real difference to me," says Weber, who was impressed by the personal touch. And although he says he isn't the type who usually buys flowers on impulse, Weber plans to use the coupon to surprise his wife with a bouquet.



American Express's new marketing strategy didn't just encourage Weber to make an additional purchase; it renewed his faith in the credit card giant. For the past 12 years, Weber has used his American Express card every month to charge about $1,000 in corporate and personal expenses. Originally a happy customer, he had recently become dissatisfied. "Their customer service hit a black hole," he says. "Every time I called, they responded with anger, hostility and rudeness. I was treated like I had no status and that I was calling only to cause problems." And now? "The next time I have a purchase to make, I will first go back to my statement and see if there is an offer that I want to use," he says.

Winning and retaining customers like Weber is exactly what CIO-100 honoree American Express hopes—and needs—to do to thrive in an increasingly competitive market. "Profits and margins [of credit card companies] are under fire," says Robert Hammer, chairman of R.K. Hammer, Investment Bankers in Thousand Oaks, Calif. Because credit card companies continuously need more customers to compensate for shrinking margins, superior customer service provides a much-needed competitive edge. "The credit card industry is a constant game of one-upmanship where the ante continues to rise," says Bill Doyle, a director at Forrester Research Inc. in Cambridge, Mass. "There is a clear preference for best-of-breed services."

American Express agrees. "This is a hotly competitive business where our growth depends on customer loyalty," says Amy Radin, vice president of global statement and rewards capabilities in New York City. "Treating people with individual care and delivering relevant values can help us win that loyalty." Equally important are American Express's relationships with its merchant partners. Since the company earns a percentage on each purchase made with its cards, achieving and maintaining a critical mass of acceptance among merchants is crucial. What's more, expanding the number of businesses that accept the American Express card wins points with customers.

Several years ago, American Express recognized that it

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could improve customer loyalty by offering customers special deals on products and services that are important to them. Although it had been marketing through direct mail, the approach "had become more and more tired," says Radin. If a merchant such as Delta Air Lines Inc. wanted to target a certain market segment, American Express had only two options. It could either print an extra message on customers' billing statements, or it could send a separate mailing. In either case, American Express could target only large groups of customers such as all corporate card members. Both approaches were costly.

Today, American Express identifies customers who will most likely respond to merchants' marketing promotions and uses convergent billing technology to send targeted marketing messages in their monthly billing statements. (Convergent billing technology was originally developed to let companies bill for more than one service on a single invoice; today it enables cross-marketing as well.) This approach helps American Express strengthen its relationships with its customers and merchant partners, and it increases operational efficiency. Radin says that with convergent billing, "we can deliver a message to the customer that's much more relevant for that individual. Since everybody reads their bills, this is a very effective channel." Although American Express has the ability to market individualized offers to single customers, it has chosen the more cost-effective strategy of creating specialized offers for targeted groups of customers. (For more on convergent billing, see "This Bill's for You," *CIO* Section 2, May 15, 1998.)

American Express developed the customer relationship statement (CRS) platform, which it launched nationwide in 1996, in-house because no commercially available software would let the company maintain tight control over its customer and merchant data—and its direct relationships with both customers and merchants. "Our use of closed-loop relationships among different kinds of information is unique," says Matthew Robinson, vice president of international statements and rewards in the United Kingdom.

Using a statistical model that matches customer history with available offers, CRS lets American Express tap into a wealth of purchase data to target customers for merchants' special offers. Given its understanding of customers' buying habits, American Express suggests specific marketing offers to a merchant. Once the merchant decides which offer sounds most promising, American Express marketers specify criteria to determine who gets the offer (for example, Boston residents who purchased perfume within the last two months). Then the application automatically prints the details of the offer on the monthly billing statement of customers who fit the criteria. So, for instance, if the China Panda restaurant in Philadelphia wanted to offer a 20 percent discount to first-time customers, the application might target all Philadelphia residents who have charged meals in the last month.

Such targeted marketing on billing statements represents a new capability for small and medium players in the credit card industry, according to Scott Nelson, a vice president in the Sales Leadership Strategies service at Gartner Group Inc. in Stamford, Conn. "Large firms have done this for a long time, but American Express is taking it to a new level by offering it to smaller merchants," says Nelson. "If you're a local operator of a national chain, you can get offers from your national office. But it's different to have a company like American Express helping you attract [local] customers."

Yet CRS does more than match the marketing message with the customer. "We prioritize who should receive what information on their statements because we manage our postal costs very carefully," says Robinson. So if, for example, adding a promotion to a customer's billing statement means that the statement will require an extra page, the customer may not receive anything about that promotion. CRS also tracks which customers take advantage of specific offers. American Express uses that information to report back to its merchant partners how well offers are doing and to suggest ways to increase customers' response rates.

American Express has set up the application so that its merchant partners never "see" the technology—or any of the customer data. They simply choose from three CustomExtras programs. With the basic offer, the application prints a short "thank you" on the statement next to the record of that purchase. The "thank you" invites the customer to call the merchant for a special offer. The accumulated rewards program gives customers incentives to make multiple purchases from the same merchant. For example, customers might see the message, "Shop three more times over the next three months at Block Print Graphics, and you'll receive a free framing job" on a statement. The application will then track purchases for the next three months, reminding the customer on subsequent statements of how many more purchases are required to qualify. When the customer hits the threshold, a coupon is automatically included in the next billing statement. With the third program, customers receive coupons but no written messages with their billing statements.

"This is a great way to get new customers," says Brian Jersey, president of 1-800 Birthday LLC, an American

37 percent of customers have increased their shopping frequency in response to the targeted offers. And more than 40 percent now feel more positively toward American Express.

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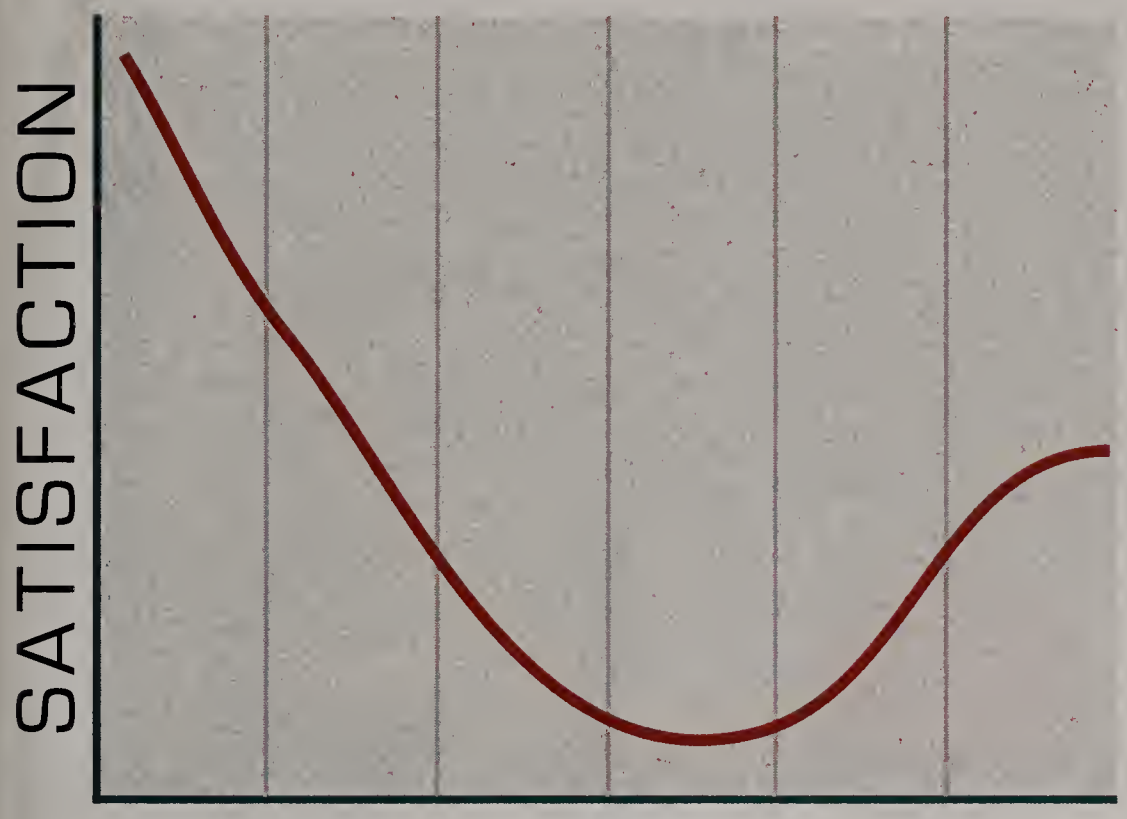

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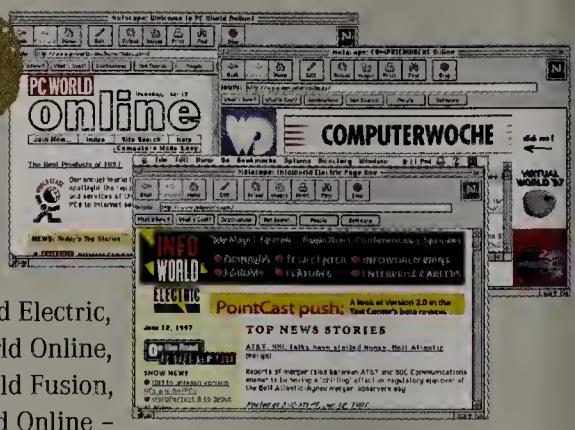

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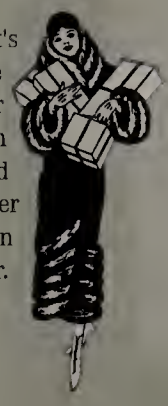

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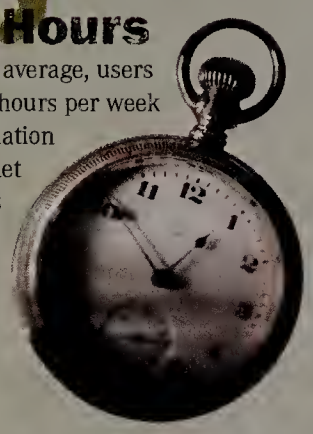

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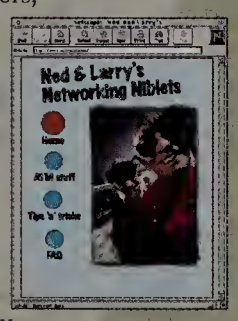

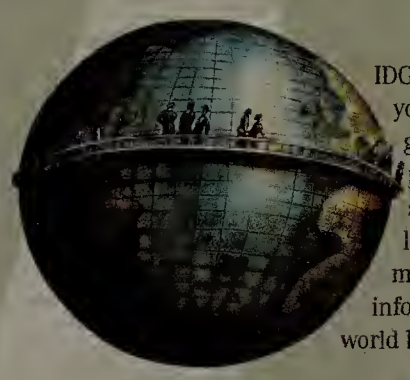

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Handshake

Express merchant partner in Norwalk, Conn. Since choosing to participate in the coupon-only program last year, his company's gift and reminder service has seen significant results. "Compared with similar programs, the American Express program gets the highest response, generates the greatest number of calls and produces the highest conversion from potential sales to actual sales," says Jersey. He also appreciates the association with a well-known customer brand and the sheer simplicity of CustomExtras. "I don't think the average customer thinks about how the program works," says Jersey. "They simply see an offer and save a buck."

For many customers, the offers seem too good to resist. According to an American Express marketing poll, 37 percent of customers said they have increased their shopping frequency in response to the targeted offers. Two-thirds found the reward certificates valuable. And more than 40 percent said they now feel more positively toward American Express. (The other customers either couldn't remember receiving the offers or simply felt neutral.)

American Express's merchant partners also benefit. "In general, the results are much stronger than those produced by direct mail," says Radin. On some offers, participating merchant partners have seen customers increase their purchases by as much as 20 percent. And because American Express receives a percentage of each purchase made with its cards, increases in spending generated by CustomExtras and the CRS application mean more profits for American Express. At the same time, the company has been able to expand its relationships with merchant partners, convincing hundreds of thousands of new merchants who operate locally to accept American Express cards.

How might American Express improve the performance of its convergent billing program in the future? Possibilities include moving the CRS application to the Internet, thereby satisfying some customers' preference for online billing while opening up yet another channel of communication. The move would also let merchants do just-in-time marketing such as selling inventory at the last minute. In addition, the company is looking at possible synergies between CRS and the direct mail program that would produce more specific segment marketing. "[CRS] can be used to feed any channel," says Robinson.

Meanwhile, Mark Weber looks forward to receiving his next billing statement—and more offers. "To know that they're doing this whets your interest for the next time." Who would have imagined that customers could get so excited about receiving their bills? CIO

Louise Fickel, a freelance writer based in Yellow Springs, Ohio, can be reached at RiceKid@ix.netcom.com.

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Index

Page numbers refer to the first page of the article(s) in which the company is mentioned. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Company Index

1-800 Birthday LLC 76
ACNielsen Corp. 38
American Red Cross 68
Andersen Consulting 12, 38
Apple Computer Inc. 84
BASF Bioresearch Corp. 48
Breault Research Organization Inc. 48
Chrysler Corp. 58
Cluster Competitiveness 48
Compass America Inc. 12
Data General Corp. 48
Delta Air Lines Inc. 76
E3 Corp. 38
Ford Motor Co. 58
Forrester Research Inc. 76
GartnerGroup Inc. 76
Hackett Group, The 12
Haworth Inc. 24
Hogan & Hartson LLP 20
IBM Corp. 12, 28, 38
ICF Kaiser International Inc. 48
International Data Corp. 38
Manugistics Inc. 38
Marcam Corp. 38
McHugh Software International Inc. 38
Nabisco Brands Co. 12
Nokia 48
Novell Inc. 84
Optipower Corp. 48
Oracle Corp. 12
Pittiglio Rabin Todd & McGrath 58
R.K. Hammer Investment Bankers 76
Regional Technology Strategies Inc. 48
Revco Corp. 38
SAP AG 38
Saturn Corp. 58
Spectrophysics Lasers Inc. 48
SPI Polyols Inc. 38
Symbol Technologies Inc. 38
Telefonaktiebolaget LM Ericsson 48
Telxon Corp. 38
Texaco Inc. 12
Trumpf Inc. 48
Union Carbide Corp. 38
Walt Disney Co., The 12
Wiremold Co., The 48
Yamaha Europe 48

Advertiser Index

** Denotes Section 2 Advertisers*

3Com Corp. 21*
Acucorp Inc. 72, 86*
Acxiom Corp. 19*
AIIM 33*
American Power Conversion 27*
Attachmate Corp. 17*
Baan International 73*
Bindview 45*
BMC Software 61*
Boston University 83
Business Objects Inc. 67*
CIO Communications Inc. . 36*, 56, 74*, 82, 83*
Cisco Systems Inc. 43
Computer Associates Intl. Inc. C4, C4*, 5
Compuware Corp. 22*
Crossworlds Software 13*
Data General Corp. 35*
Dell Computer Corp. C2, 31*
Digital Delivery 81*
DLTtape Systems 28
Dow Jones & Co. 33
EDS Corp. 89
Ernst & Young LLP 50
Exabyte Corp. 9*, 56*
Executrain Corp. 71*
Fidelity Investments 67
Fulltime Software 2
Gateway 2000 Inc. 8
Hewlett-Packard Co. 16, 78, 81
IBM Corp. 10*, 38
IDG.net 80*
Inacom Corp. 22
Information Builders Inc. 3*
Intelispan 91
Keane Inc. C3, 77
Kronos Inc. 25
Lockheed Martin Corp. 27
Lucent Technologies Inc. 37, 62
Masters of the Web 85*
Millennia III 35
NEC Technologies 46
Netscape Communications Corp. 13
Network Appliance 63*
Networld+ Interop 77*
Nortel 5*
Oracle Corp. 7
Pegasystems Inc. 87
PeopleSoft Inc. C2*
Pinnacle Decision Systems Inc. 37*
Prestige Software Intl. 42*
Reasoning Software 19
Robert Half Intl. Inc. 75*
SAP America Inc. 55
SAS Institute Inc. 21
Secure Computing Corp. 15*
Sensormatic Electronics Inc. 55*
Sequent Computer Systems 25*
Sybase Inc. 47*
TBI 79*
Tibco 51*
TRUE Software 15
Unisys Corp. 11
US Data 65*
US West (Regional) 56
UTA 85
Xerox Corp. 7*
Xircom 53*

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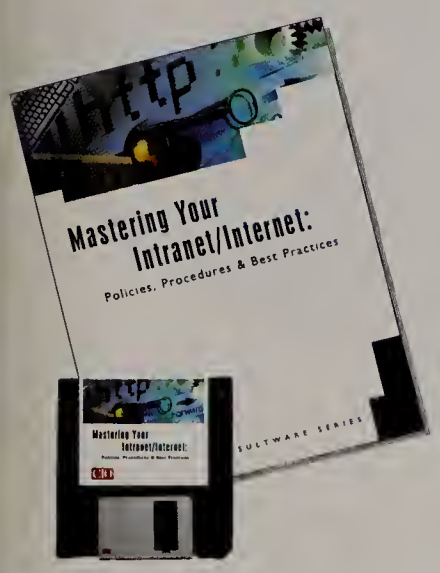

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Your OS at Work

YOU MIGHT NOT KNOW IT, but your operating system is one of your closest and most loyal coworkers. From the moment you turn on your computer in the early morning until the late hours of the workday when you shut it down, your operating system is working, interpreting your every move and "talking" to all of your computer's programs. You might say it runs your work life.

What does an operating system do for me? A better question might be, What *doesn't* it do? For starters, an operating system (OS) is the "interpreter" between you and all of the software and hardware on your computer's system. Just as an interpreter helps communication among foreign diplomats, your OS translates your commands ("open file") into the 1s and 0s the computer can understand. But more than merely interpreting, the OS becomes a traffic cop. If you're running two applications on your PC at the same time, the OS juggles the computer's resources, such as the "thinking time" that each application demands from the main processor, so that your spreadsheet can keep crunching numbers in the background while you sneak in a couple of holes of Microsoft Golf. The OS also controls internal components, such as memory, external devices—monitors, modems, storage devices—and the look and feel of the user interface.

How many kinds of operating systems exist? Too many to list here, but you've probably heard of Microsoft Corp.'s Windows 95, Apple Computer Inc.'s Macintosh OS, IBM Corp.'s MVS and the various "flavors" of Unix (see box), which top the list of operating systems used today. Different OSs are designed for different kinds of computers; Windows runs on PCs, whereas MVS runs on mainframes.

An important distinction to note: A desktop OS, such as Windows 95, runs a single computer; a network operating system (NOS), such as Novell NetWare, controls how groups of individual computers and other devices communicate. A NOS allows users to share files across a network and to access shared devices such as printers, scanners, servers and gateways.

What happens to my OS when my computer crashes? Your system may be affected slightly, but a crash usually will not cause permanent damage. Many factors come into play when one occurs: the design of the OS itself, the nature and severity of the crash, what files and applications were open at the time, and what procedures are used to recover from the crash. A crash may affect the stability of the OS, which may make another one more likely, leaving the OS more unstable and possibly causing the equivalent of a concussion in your computer's brain.

–Tom Wailgum

ILLUSTRATION BY PETER ALSBERG

Buzzwords

GUI ***(pronounced "gooey")*****:** The graphical user interface is what you use to give directions to your computer's operating system—that is, the pull-down menus, folders and icons.

Flavor: An OS variation such as Unix. Different companies make modifications to the basic Unix OS to create their own flavors: HP-UX, AIX, DG-UX, SCO Unix, Solaris and so forth. Software written for the HP-UX variant will not work on a system running Solaris, even though both are Unix operating systems. Ridiculous, isn't it?

Crash: Also called abend (abnormal end) or bomb; when your computer "freezes" and you need to reboot.

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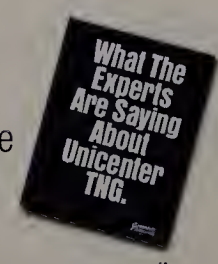

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